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**EXPLORATORY STUDY OF SUCCESSFUL MANAGEMENT
APPROACHES FOR SMALL PROTECTED AREAS.**

By



LESLEY P. CURTHOYS BROWN

**A thesis submitted to the Faculty of Graduate Studies and Research in partial
fulfillment of the requirements for the degree of Doctor of Philosophy.**

Department of Renewable Resources

Edmonton, Alberta

Fall 1995



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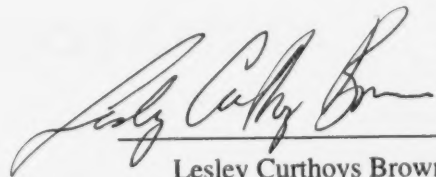
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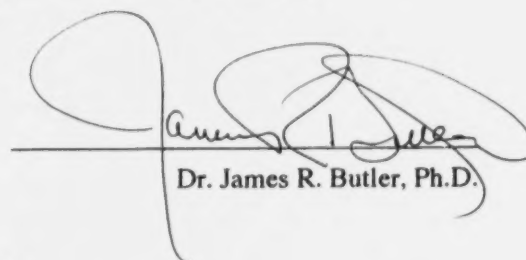
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*Stephen Levine, 1974
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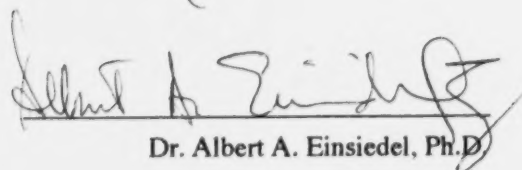
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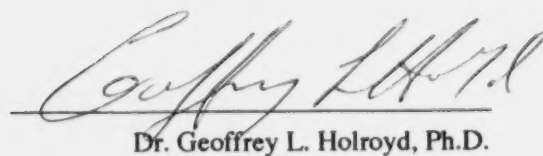
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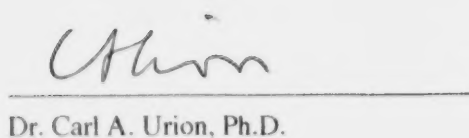
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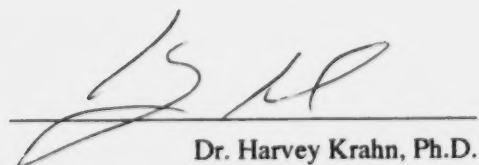
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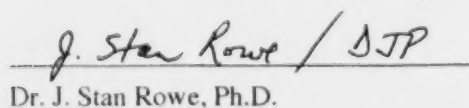
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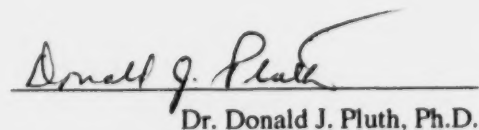
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DEDICATION

**To Caitlin Rose Brown and Arthur Cowan Brown
and all the future Earth stewards.**

This work is for you.

**Never doubt your inherent Earth wisdom and your spontaneous love for all life in
its many manifestations.**

You indeed know the truth.

ABSTRACT

It generally is recognized that large protected areas are ecologically superior to small ones. Unfortunately, ecological logic seldom determines political realities. Canada's protected area system -- comprising mostly sites less than 1,000 hectares in size -- is a case in point. We can expect to see an increase in the number of small protected areas as options to secure large tracts of land disappear. In addition, private landowners interested in contributing to conservation objectives may be stewards of land parcels as small as 64 hectares.

The goal of this study was to learn from practitioners how to successfully manage fragile ecosystem fragments -- small protected areas. The study findings are based on analyses of a diverse set of small protected areas that were nominated, by protected area managers and other professionals in conservation-related fields, as examples of excellence in conservation management. Specifically, I used a qualitative case study approach to identify characteristics associated with excellence in conservation management at 16 exemplary small protected areas. Applying thematic content analysis, 14 common "attributes of excellence" associated with successful small protected area management were identified, described, and then compared (using a "landscape-level management" conceptual framework) with the current thinking in protected areas management. Two in-depth case studies (using ethnographic interview analyses), provide a more holistic understanding of successful small protected area management.

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CHAPTER 1

INTRODUCTION

A healthy landscape is the foundation of healthy and meaningful lives. To maintain a healthy landscape, we need at the very minimum, an ecologically viable system of protected areas. The ecological viability of a natural area is strongly dependent on size and on distance from other natural areas. The smaller and more isolated a natural area becomes, the greater its vulnerability to both natural and unnatural disturbances. Indeed, even many large reserves, thousands of hectares in size, are considered threatened. Accordingly, it is generally recognized that large protected areas are ecologically superior to small ones.

Under ideal conditions, then, an ecologically viable protected area system would consist of expansive tracts of land. Unfortunately, ecological logic seldom determines political realities. Canada's protected area system -- comprising mostly sites less than 1,000 hectares in size -- is a case in point. Small protected areas are essentially fragile landscape remnants, and thus we can assume that the majority of Canadian protected areas are currently at risk.

One of the reasons there are so many small protected areas is the fragmented state of the Canadian landscape. Landscape fragmentation is caused by industrial, agricultural, and urban activities. The result is direct loss, alteration, and isolation of natural areas. Fragmentation of wildlands continues at an alarming rate. We can therefore expect to see an increase in the number of small protected areas as opportunities to secure large tracts of land disappear. With so many existing small protected areas, and a predicted increase in the ratio of small to large protected areas, a primary concern is how ecological remnants should be managed to maintain or to re-establish ecological viability.

To achieve this goal, a holistic management approach that integrates protected areas into local communities and surrounding human-dominated landscapes is currently advocated in scientific literature related to protected area management. However, paradigms in land management continue to evolve and many questions pertaining to effective conservation in fragmented landscapes have yet to be answered. These questions include how to mimic ecological processes when our understanding of ecosystems is still so limited, and how to assess management effectiveness when key concepts such as "ecological viability" and

"ecosystem health" have yet to be accurately defined and measured. Even more fundamentally, we have yet to achieve consensus -- as scientists and as a society -- regarding the value we accord to natural places.

This study is about landscape fragmentation -- the process of breaking integrated living communities into isolated parts. Specifically, this dissertation focuses on what actions can be taken to ensure the long-term survival -- ecological viability -- of the valuable, but impoverished, isolated living communities that are the result of landscape fragmentation. Placed in the context of protected area management, the question becomes, "What are successful management approaches for small protected areas?"

WHAT ARE SMALL PROTECTED AREAS?

Unlike national parks or provincial parks that are well known entities to most North Americans, small protected areas lack a national identity. This lack of identity is the result of the tremendous diversity in mandates, managing authorities, and names associated with small protected areas. What all small protected areas do have in common is their ecologically compromised condition. Despite their size and ecological vulnerability, however, small protected areas do contribute toward conservation goals.

Perhaps one of the most well known small protected areas is Walden Pond. Today a 120-hectare protected area, the Walden Pond Reservation pays tribute to the wildlands that influenced Henry David Thoreau. It was the woods surrounding Walden Pond that inspired Thoreau to write his greatest works: literary works that continue to influence society's perception of nature. Thomas J. Lyon (1989:54) wrote, "from the woods, Thoreau looked at his times with a wild perspective that no one before him in American life had developed so concretely or thoroughly."

Although most small protected areas lack Walden Pond's widespread recognition, many of these small conservation lands, being close to population centers and often established and cared for by local citizens, no doubt have touched and continue to touch the hearts of many people.

CONSERVATION STATUS OF SMALL PROTECTED AREAS

A preliminary step in this broad-based study of small protected area management was to gain a more comprehensive understanding of the conservation status of small protected areas.

Methods

To achieve this objective, I analyzed available data bases from individual conservation organizations as well as the Canadian Conservation Areas Database (now called the Canadian National Conservation Area Data Base - NCADB), developed by State of the Environment Reporting, Environment Canada (Rubec et al. 1990). No comprehensive protected area data base was available for the United States.

The NCADB, the most comprehensive database available in 1990 for Canada, consisted of information on 2,940 sites currently managed by federal, provincial, and territorial agencies. Of these sites, 977 were recreation-focused provincial and territorial parks. Because my study pertains to protected areas with conservation as the primary management focus, I excluded recreation-focused provincial, historic sites, and territorial parks from some of the following analyses. Conservation lands protected by municipal and county governments, and some lands protected by non-government agencies such as the Nature Conservancy of Canada, Ducks Unlimited, and Wildlife Habitat Canada, were not included in the NCADB at the time the analysis was done. However, these non-government conservation lands, were estimated to conserve 7.1 million hectares (Rubec et al. 1990). Many of these types of protected areas are likely to be less than 1,000 hectares. For example, the average size of a Nature Conservancy property is 79 hectares (Nature Conservancy Canada 1992).

Results

The information gleaned from this analysis included the number of small protected areas, cumulative area protected, types of small protected areas, management objectives, and natural ecoregion representation.

Number of Small Protected Areas

The majority (76%) of Canadian protected areas are less than 1,000 hectares. The percentage of small protected areas would increase to over 80% if recreation-focused conservation lands were included. Other conservation data bases also indicated a high ratio of small to large protected areas. For example, the majority of conservation lands protected by the Nature Trust of British Columbia (99%); and the University of California Natural Reserve System (80%), are smaller than 1,000 hectares in size. In addition, 67% of the education-focused protected areas listed for Canada in the 1990 Directory of Natural Science Centers, are small (Natural Science for Youth Foundation 1990).

Cumulative Area Protected

The cumulative area protected by small versus large protected areas is 268,880 ha and 67,452,554 ha respectively. Small protected areas conserve only 0.4% of the total land protected by federal, provincial, and territorial governments. Given the high probability that most county/municipal and non-government protected areas are less than 1,000 hectares, then the cumulative area conserved could increase to 9.8%. Table 1.1. shows the number and cumulative area of small and large protected areas for each province and territory.

Table 1.1. Number of small versus large protected areas in Canada.*

Province	Number of Sites		Cumulative Area (ha)	
	Small	Large	Small	Large
BC	398	80	59,923	5,534,647
AB	113	44	26,848	5,278,512
SK	19	25	7,485	1,470,320
MB	40	60	11,776	4,861,261
ON	717	132	117,145	6,664,491
QC	90	73	25,719	16,089,165
NB	13	15	2,944	384,261
NS	46	13	8,518	307,387
PE	17	2	3,817	27,030
NF	27	10	3,605	720,860
NT	2	21	1100	21,993,280
YT	0	6	0	4,121,340
TOTAL	1482	481	268,880	67,452,554

*Analysis does not include historic sites, recreation-focused provincial parks, municipal/county protected areas, or all of the non-government conservation lands.

Types of Small Protected Areas

In Canada, a broad range of conservation lands exists. Table 1.2 summarizes information about 14 types of protected areas. It indicates, first, the number of these areas that fall into the small or large size categories, and second the percentage distribution of protected areas types falling within the large and small size categories. The largest percentage of small protected areas in this database are recreation-focused provincial parks. Conservation-focused provincial parks, ecological reserves, national wildlife areas, heritage areas, historic parks, Conservation Authority Areas, and National Capital Commission Areas also tend to be small in size. Surprisingly, there are over four times as many small as there are large wilderness areas. As expected, however, almost all national parks are greater than 1,000 hectares.

Table 1.2 Types of small and large protected areas in Canada.

Type of Area	Number of Sites		Percentage	
	Small	Large	Small	Large
Provincial-Conservation Focus	506	174	21	32
Provincial- Recreation Focus	842	64	35	12
Ecological Reserve	373	64	16	12
National Park	1	33	<1	6
Wildlife Protection Area	30	26	1	5
National Wildlife Area	36	9	2	2
Wilderness Area	31	7	1	1
Heritage Area	18	0	1	0
Migratory Bird Sanctuary	60	38	3	7
Historic Park	53	2	2	<1
Wildlife Management Area	67	115	3	21
Conservation Authority Area	310	9	13	2
National Capital Commission Area	58	4	2	<1
Nature Trust Area	10	0	<1	0
TOTAL	2395	545	100%	100%

Management Objectives

An indication of management objectives of small protected areas is provided by looking at the representation of small protected areas by the International Union for the Conservation of Nature and Natural Resources (IUCN), or the World Conservation Union, categories which are based on management priorities (Table 1.3). In general, as one moves from category I through to V, the level of protection decreases, while the level of sustainable conservation practices allowed, such as hunting, increases. From this analysis, it is evident that small protected areas fulfill a wide range of management objectives.

Table 1.3. Distribution of small protected areas by IUCN category.

IUCN Category	Number of Sites	Percentage
I. Scientific and Strict Ecological Reserves	472	32
II. National/Provincial/Territorial Parks	377	25
III. Landmarks/Natural Monuments	4	1
IV. Managed Nature/Wildlife Reserves and Sanctuaries	213	14
V. Protected Seascapes/Landscapes	371	25
Other	45	3
	TOTAL 1482	100

Terrestrial Natural Regions

In almost half (46%) of Canada's terrestrial natural regions, the majority of protected areas were in the small size category. The large number of small protected areas suggest that these sites contribute to regional biodiversity by increasing the variety of habitats and thus species conserved.

Since the above analysis was done, the NCADB has expanded to include data on 3,500 government properties. Of these properties, 2,872 sites (82%) are smaller than 1,000 hectares. Collectively they cover 2% of the total area protected as government conservation lands (Wiken and Lawton 1995). Also, according to Wiken and Lawton (1995), in Canada there are an additional 9,500 non-government protected areas, many of which are small.

Summary

A comprehensive understanding of the conservation status of small protected areas in Canada and the United States is dependent upon development of a complete data base with information on all government and non-government protected areas. Nonetheless, some general conclusions from the above analyses of partial data bases can be drawn. First it is apparent that although small protected areas do not make significant contributions in terms

of total area protected, the majority of conservation sites in Canada are ecological fragments less than 1,000 hectares in size. Similar trends are expected for the United States. Second, it is apparent that small protected areas contribute to a wide variety of conservation objectives from strict protection to multiple-use. In particular, Canadian small protected areas contribute toward the goal of achieving a representative protected area system. Third, over 70% of Canada's small protected areas are managed by non-government organizations.

WHY STUDY SMALL PROTECTED AREAS?

A recent update on the status of Canadian conservation lands by Wiken and Lawton (1995) showed that this country's protected area system "largely consists of small areas, many of which are in the southern, populated parts of Canada." Theberge (1993:137) states that, "we have lost almost all of every Canadian biome except the boreal forest and tundra." If managed effectively, these ecosystem fragments can make significant contributions to conservation goals; however, we still have much to learn about effective conservation strategies for fragmented landscapes.

Conservation Functions Of Small Protected Areas

A review of literature pertaining to small protected areas and ecosystem fragments, in general, suggests that these small conservation lands contribute to a healthy landscape by performing three functions: (1) enhancement of pro-conservation attitudes; (2) reduction of habitat isolation; and (3) conservation of biodiversity.

Enhancement of Pro-conservation Attitudes

As is evident from Walden Pond, protected areas do not need to be large to nurture strong allegiances with nature. Establishing and maintaining a network of ecologically viable protected areas is largely dependent on a strong constituency of supporters. Regardless of size, all protected areas provide opportunities for nature-related recreation, research, conservation education and employment or experiencing a natural place. These opportunities are essential for building support for local, regional, and global conservation initiatives. This role is an especially important one for urban protected areas, because urban populations wield significant political and economic power, yet tend to be alienated from the natural world (Lusigi 1988). As urbanization accelerates, an increasing number of people grow up in environments dominated by human development, and it is not surprising that

society, in general, is alienated from the natural world. In his award winning book, *Practice of the Wild*, Gary Snyder (1990:36-39) highlights the need to "regain personal, local, community and peoples' direct involvement in sharing (in being) the web of the wild world" and that "our relation to the world takes place in a place, and it must be grounded in information and experience." Protected areas close to and within cities provide much needed places for people to gain and regain positive connections with nature (Sheail 1976; Cole 1983; Cole 1991; Hjertaas 1991). In addition, protected areas within easy driving distance of universities and colleges are readily accessible for field studies and research.

Reduction of Habitat Isolation Caused by Fragmentation

Landscape fragmentation has been identified as a leading cause of the loss of species and also the disruption of species composition and function (Wilcox and Murphy 1985). The end result is a degradation of landscape ecological viability (Whitcomb et al. 1981; Mader 1984; Harris 1984; Wilcove et al. 1986; and Reid and Miller 1989). Small protected areas, although fragments themselves, reduce the negative impacts of fragmentation of larger tracts of wildland. Harris and Eisenberg (1989:179) comment that, "it is also beginning to appear that the acreage committed to conservation may be a less important variable than the configuration of that acreage in the landscape." Through effective reserve design; management; and land use planning at local, regional and landscape-levels; ecosystem remnants can function as transition (buffer) zones, conservation corridors, and migratory stopover points (MacClintock et al. 1977; Noss 1983; Harris 1984; Soulé and Simberloff 1986; Webb, 1987; Noss 1987; Reid and Miller 1989; Epp 1991; Rowe personal communication). Thus small protected areas -- as living stepping stones -- can contribute toward a more ecologically viable landscape configuration.

Conservation of Biodiversity

Although it is preferable to protect large tracts of wildlands, the preservation of biodiversity does not always require extensive areas. For example, a wild perennial species of maize (all other forms of maize are annuals) which could save farmers several thousand million dollars a year was discovered growing on a mere four hectares of land (Fisher 1982). Several authors (Prescott-Allen and Prescott-Allen 1981; Simberloff and Gotelli 1987) have indicated that small protected areas can be used to maximize the variety of habitat types, and are valuable for conserving within species variation. In addition, Wetterberg et al. (1981:6) state that, "smaller reserves serve useful functions such as providing multiple evolutionary opportunities and preserving taxa of highly restricted ranges, nesting sites, and unusual

microhabitats." Thus remnant ecosystem patches, despite their ecologically compromised state, contribute to the perpetuation of long-term regional diversity. The degree of contribution toward regional biodiversity depends on whether sites are managed in isolation from or as part of the surrounding landscape (Noss 1983).

To summarize, small protected areas augment the conservation value of large protected areas and thereby make important contributions toward achieving a representative and viable network of protected areas in three ways: by conserving a greater variety of biodiversity; by reducing the impacts of habitat fragmentation; and by providing the stimulus to foster public support for local, regional, and global conservation strategies.

Knowledge Gap in Small Protected area management

Although small protected areas are important to conservation goals, there is much to be learned about effective management strategies for fragmented landscapes. An extensive literature review, conducted in 1990, found no broad-scale summary studies related to the challenges and solutions of effective small protected area management. Furthermore, status reports on protected areas compiled by the IUCN (1990), only included protected areas larger than 1,000 hectares, with the exception of islands. Hence, there is a knowledge gap on the status and on the overall effective management of small protected areas.

This lack of attention given to small protected areas is not surprising because, as Wiken and Lawton (1995) comment, many people believe that protected areas need to be greater than 1,000 hectares "to have any hope of maintaining ecological integrity." As noted earlier, fragmentation of contiguous landscapes causes habitat loss, alteration, and isolation, severely impairing ecological viability of the remaining fragments, making the fragments more prone to threats such as pollution. Consequently, many conservationists indicate that large protected areas are preferred to small ones because they have a greater capacity to make long-term contributions to conservation strategies (Diamond 1975; Sargent and Brande 1978; di Castri and Robertson 1982; Schonewald-Cox 1983; McNeely and Thorsell 1991), such as those embodied by the World Conservation Strategy (IUCN 1980). Nonetheless, because of ongoing landscape fragmentation, many conservation lands are small.

The fragmented state of many landscapes, combined with the conservation value of landscape remnants, and our existing lack of knowledge pertaining to effective management

of fragmented landscapes, implies that there is a need to improve our understanding of successful stewardship approaches for small protected areas.

RESEARCH QUESTION, GOALS, AND OBJECTIVES

There is a need to identify common management challenges, and to share information on effective management strategies for fragmented landscapes. This need is magnified because management resources, such as funds, are limited for many conservation organizations and private landowners. With shrinking government budgets and increasing landscape fragmentation, the need to evaluate small protected area management practices, and to communicate successful management options to private and public land stewards has never been greater. One might anticipate that effective management strategies for small protected areas could be readily transferable to large areas, whereas the opposite may be untrue. A study of small protected area management, therefore has the potential to make significant contributions to conservation research in general.

The research question to be addressed in this study is:

“What are successful management approaches for small protected areas?”

The goals of this exploratory study are, first to learn from practitioners how to successfully manage fragile ecosystem fragments -- small protected areas -- and then, to share the information gained in a format useful to other land stewards.

The specific research objectives are as follows:

1. to provide a general assessment of the conservation status of small protected areas in Canada and United States,
2. to identify current challenges in small protected area management,
3. to identify characteristics associated with successful small protected area management through case-study analyses of peer-nominated examples of excellence,

4. to contribute to the developing paradigm of land stewardship as it pertains to conservation of ecosystem fragments.

METHODOLOGY OVERVIEW

To understand successful management approaches for small protected areas, it is first necessary to define what is meant by the key terms: "small protected area" and "successful management."

Terminology

Many terms related to conservation are loosely defined, vary geographically, or carry strong personal meanings. For example, in Canada there are more than 75 different names for legally protected areas, even though many have similar purposes (Rubec 1990). Moreover, protected area uses range anywhere from "no use" to "intensive outdoor recreation" or even "resource extraction." Protected area characteristics include: (1) represent preservation side of conservation land spectrum; (2) recreation and education emphasize intrinsic values of nature; (3) extractive activity generally prohibited; (4) research and monitoring encouraged to understand and perpetuate ecological processes; (5) benchmark control area to measure successful sustainability; (6) contains the formality of some official designation; (7) biocentric in land philosophy; (8) management goals permit ecological processes to shape land naturally or are restored purposefully (Butler, personal communication).

In this study, "protected area" is defined as "land officially reserved for the protection of natural intrinsic values rather than for recreational or resource extraction purposes" (Eidsvik 1989). Both government and privately owned natural lands are encompassed by this definition. Natural landscapes excluded by the definition of protected area used in this study are those sites that are not primarily respected for their natural features; such as, campgrounds, picnic areas, parkways, wayside parks, and historic sites with no nature conservation objectives. This definition also excludes natural landscapes protected through informal agreements such as private lands protected by habitat conservation agreements. Although informally protected natural lands are essential to achieving healthy landscapes, they were not included in this study because it would have made the scope of this study far too cumbersome.

Size is a relative concept, both ecologically and socially. "Small" is defined here as "fewer than 1,000 hectares." One thousand hectares is equivalent to 10 square kilometers, 2,471 acres, or 3.86 square miles.

"Management" is another ambiguous term. For example, this word can have negative connotations suggestive of ecosystem manipulation. To avoid this negative interpretation, management is defined in this study according to the Oxford dictionary (Allen 1990) as "action toward desired end results," rather than as, "control over something." I use "management" and "stewardship" interchangeably.

Defining "successful" management approaches for small protected areas is the main focus of this study.

Research Design

An exploratory multiple-case-study research design is used to learn about effective management of small protected areas. An exploratory approach is necessary because the current paradigm in land conservation is in a state of flux (Grumbine 1994), and there is sparse information on effective conservation of fragmented landscapes. A case study design is particularly appropriate for understanding excellence in small protected area management and as Eagles (1993) remarks, "The best way to understand environmental management in parks is to study practical examples." Stake et al. (1978:31) defined the case study research design as a "study of a bounded system, emphasizing the unity and wholeness of that system, but confining the attention to those aspects that are relevant to the research problem at the time." In this study, the bounded system is the management program of a small protected area. The aspects relevant to successful small protected area management are determined by the stewards' perceptions of why their management approach works and how it could be further improved. The major limitation of the case study design is low generalizability. Generalizability can be increased through multiple case studies (Yin 1988), as is done in this study of 16 peer-nominated small protected areas.

In the following section I discuss the case study methodology applied in this study. Specifically I review: (1) how the 16 case studies were selected; (2) the case study protocol (how, what and why data types were collected); and (3) the analytical techniques applied to understand successful small protected area management.

Case Study Selection Process

To identify examples of excellence in small protected area management I implemented a three-step peer review process.

Step One: Survey of Protected Area Managers

Step one of the selection process involved surveying protected area managers to ask their recommendations of, "a small protected area which demonstrates excellence in conservation management." A non-random, stratified (by country, region, and protected area type) sample of 1099 managers was surveyed using either a self-administered questionnaire or a telephone interview. The 451 respondents were managers of public and private protected areas from across Canada (39%) and the United States (61%).

A non-probability sampling design was used, because at the time the survey was implemented, no comprehensive data base of protected areas for Canada and the United States was available. Consequently the sample of managers is biased in favor of managers of protected areas types such as national and provincial parks that tend to be included in protected area data bases. Likewise, the sample is biased against non-government protected area types owned by organizations and individual private landowners, that are more difficult to obtain information on. However, these biases are not important, because the research question does not require *representative small protected areas*, rather, the research question requires *valid examples of successful small protected area management programs*.

Small protected areas exhibit tremendous diversity across many variables, such as management authority and objectives. Given this diversity and the fact that this is an exploratory study, I chose to cast a broad net to capture a wide variety of small protected area types. In doing so, the research findings should be more useful to a wider audience of land stewards, because as Platt (1988) states, diversity rather than representatives can strengthen the argument for case study generalizability.

Protected area managers were asked to recommend a small protected area that, in their opinion, demonstrated excellence in conservation management. The selection criteria included size (less than 1,000 hectares) and protected area status. The nominated small protected areas were checked to the best of my ability, for appropriate size and protected area status. The final list of nominated sites is provided in Appendix A.

Step Two: Peer Review of Nominated Sites

The next phase of the selection process was to identify a subset of the nominated sites, thereby providing a manageable number of case studies. Again, I relied upon the opinion of protected area managers. To obtain peer consensus, 60 other protected area managers, and professionals in conservation-related fields, were asked to review the candidate site list (the jury nomination package is presented in Appendix A). Reviewers were not asked to *rank* nominated sites, rather they were asked to indicate for each site, one of the following: *yes* -- if familiar with site and *agreed* it demonstrated excellence in conservation management; *no* -- if familiar with site but *disagreed* it demonstrated excellence in conservation management; or *don't know* -- if *not familiar* with the site. The "jury" also had the opportunity to nominate new examples of excellence, but were asked to do so prior to seeing the existing list of candidate sites to avoid possible bias.

Given the wide geographical coverage of this study and the wide diversity of protected area types in Canada and the United States, I considered peer consensus by two or more people to be sufficient validation of excellence. Sites receiving three or more nominations, were given highest priority for case study analysis. It is recognized, however, that a high number of nominations may also reflect site popularity. Candidate sites receiving a negative assessment were not considered for case study analysis. For example, two highly recognized small protected area management programs in Alberta -- Wagner Bog Natural Area and Clifford E. Lee Nature Sanctuary -- were not included in this study because both received one negative assessment. No doubt numerous other examples of excellence have been omitted, as well.

Along with peer consensus, logistics played a role in selecting study sites. In order to maximize travel funds, I selected multiple-nominated sites that were geographically clustered or *en route* to high priority sites. This second factor explains the large number of study sites along the West Coast and the cluster of sites in Arizona.

Step Three: Final Verification

Final verification of a protected area's status as a example of excellence in conservation management was determined by the manager's self-appraisal, external sources of recognition, and my on-site evaluation. Three sites were eliminated at this stage of the selection process. Although, I studied a total of 33 nominated examples of excellence, in

this paper I include only the 16 case studies for which I was able to obtain complete data sets.

Despite this rigorous selection process, I recognize that many examples of excellence will be missed and that, "excellence in conservation management" remains a subjective concept with numerous interpretations. Because I used a diverse jury and studied only sites with multiple nominations, I believe the 16 sites studied are valid examples of successful small protected area management programs. Results of the case study selection process are provided in Chapter 3.

Case Study Protocol

I primarily followed case study design recommendations in Yin (1988). Other useful references include House 1980; Fowler 1988; Rubin 1983; Grosf and Sardy 1985; Burgess 1988). I gained additional information on case study research by reading a diversity of case study examples from scientific (Whyte 1955; Riley 1963; Towl 1969; Stake et al. 1978; Brodtrick 1988; Tanner 1990) and non-scientific (Peters and Waterman 1982) literature. One of the major strengths of the case study approach, according to Yin (1988) is that construct validity is increased through corroboration of both qualitative and quantitative data from multiple sources. In this study, quantitative and qualitative data sources for each case study include: a 54-question written survey; a semi-structured interview; an on-site evaluation; and a variety of management-related documents (such as interpretive brochures, management plans, related publications, and annual reports).

Written Survey

The written survey (Appendix B), developed according to Dillman's total design method (1978), was pre-tested and critically reviewed for potential wording and methodological problems by three groups of people: (1) academics in protected area management and social science fields; (2) potential users of the data; and (3) protected area managers representing a cross-section of potential respondents. I used the survey to collect information on the following variables: (1) regional context; (2) establishment trends; (3) size and connectedness (percentage buffered); (4) public visitation; (5) management resources; (6) manager characteristics; and (7) habitat type. Managers received the survey well in advance, providing them time to think about the open-ended questions, and to complete the fixed-answer questions, prior to my visit. To increase data reliability, I asked managers if any questions were vague or inappropriate.

Semi-structured Interview

The primary data source was a semi-structured interview with the site manager or steward. Learning the informant's perspectives provides information on external and internal dynamics of the management program (Bogden and Bicklen 1992). I based each interview on a uniform set of open-ended questions that provided a systematic questioning framework from which I could then move into questions specific to each particular situation. Background information gleaned from management-related documents (sent to me in advance of a site visit), generated additional inquiries into management approach. The interviews typically lasted two to three hours.

In each case, I asked the manager's permission to tape the conversation. No manager refused or appeared uncomfortable about having our conversation taped, probably because of the non-confidential nature of the conversation. Tape-recording increased data reliability as it provided a complete and accurate interview record. Reliability was further increased by having only one person conduct the interviews, and transcribing the interview tape verbatim. Construct validity was increased by having each manager review this case study report (Yin 1988; Bogden and Bicklen 1992).

On-site Evaluation

The site visit provided a valuable opportunity to see and experience management practices first-hand. I usually arrived early to explore both the facilities and natural setting of the site prior to the interview so that I could ask more informed questions. I recorded site evaluations during or immediately after each visit. Photo-documentation provided an efficient and essential visual record of each site evaluation.

Document Collection

I collected pertinent information including management plans, visitor information, related research publications, magazine articles, newsletters, news releases, job descriptions etc. Management journals, visitor logs, and meeting minutes could have been very useful data sources, but were not included due to time limitations and the anticipated difficulty in checking data validity.

Case Study Analytical Techniques

To understand successful management approaches for small protected areas, I utilized a combination of analytical techniques including descriptive statistical analysis, thematic content analysis, and ethnographic interview analysis.

Descriptive Statistical Analysis

Descriptive statistics (frequencies, means, and ranges) of site-related characteristics provided background information useful in interpreting findings of content analysis.

Thematic Content Analysis

Content analysis involves "objectively and systematically picking out characteristics" of any kind of communications (Carney 1972). It can be used both qualitatively or quantitatively. Here emphasis is placed on qualitative application, to preserve the context of the data and to provide rich, in-depth insights into exemplary management practices. The analysis is based on methodologies described in Glaser and Strauss (1967), Carney (1972), Strauss (1987), and Bogden and Bicklen (1992). With thematic content analysis, the unit of analysis is the theme (subject matter of a sentence, or group of sentences), and its associated properties.

Moreover, content analysis can be used both inductively and deductively, and therefore is useful in exploration of the substantive area, and subsequent comparison of results with existing ideas on effective protected area stewardship. Inductive content analysis facilitates discovery of possible new insights into successful small protected area management. In contrast, deductive content analysis allows systematic and objective comparison of management approach at nominated examples of excellence with extant literature in protected area management (Carney 1972). This application of content analysis is based on pattern-matching logic. As stated by Yin (1988:109) such logic "compares an empirically based pattern with a predicted one." Here the predicted pattern is a landscape-level management approach, discussed in detail in Chapter 2. Importantly, pattern matching allowed me to determine if examples of excellence provide any new insights into successful protected area stewardship in general. Inductive and deductive content analysis are complementary analytical tools useful in identifying characteristics associated with successful management approaches.

Ethnographic Interview Analysis

Although thematic content analysis identified characteristics associated with successful management approaches, this methodology did not reveal how characteristics functioned together to form an effective management program. To gain a deeper understanding of excellence in small protected area management I therefore chose two of the 16 nominated examples of excellence for more in-depth analysis using a technique called ethnographic interview analysis developed by Spradley (1979). Spradley (1979:156) describes ethnography as a "methodology designed for finding out both the explicit and implicit knowledge familiar to the most experienced members of a culture." I used ethnographic interview analysis to obtain, through the manager's cultural knowledge and experience, a holistic understanding of the meaning of excellence at Ramsey Canyon Preserve and Mary's Point.

It was difficult deciding which of the 16 nominated examples of excellence to study in-depth because all 16 sites provided valuable insights into effective small protected area management. I selected Ramsey Canyon Preserve for three reasons. First, I had the most comprehensive data set for this site. Second, I had the greatest familiarity with Ramsey Canyon Preserve as I was able to stay at the Preserve three days and two nights. Finally it had received three nominations as an example of excellence.

Mary's Point (part of the Shepody National Wildlife Area) was chosen as the second site for in-depth case study analysis because it shared similarities in terms of popularity as a birding destination, yet provided a contrasting case study with respect to three variables identified as important to effective management at Ramsey Canyon Preserve: ownership (private versus public); financial independence (high versus very low); staff resources (high versus very low).

The manager of Ramsey Canyon Preserve stressed the advantages of private ownership of land in that it facilitates a single-use mission. Consequently, I was interested in knowing if private ownership was essential to implementing a protection-first mandate. As a government-owned small protected, Mary's Point provided a contrasting case study. In addition, an outstanding feature of Ramsey Canyon Preserve was its strong management resources, both in terms of finances and staff. Again, Mary's Point, with no on-site paid staff and a very insecure budget, provided a contrasting situation; one that is probably more typical of small protected areas.

A third case study would have been beneficial for purposes of triangulation; however, as the in-depth case studies went beyond the original research objectives and time was running out, I was satisfied to complete two case studies for the purposes of this dissertation. With the positive responses I have received about the usefulness of the two in-depth case studies and the international interest in preliminary findings (Appendix D), I plan to complete in-depth case study analysis with some of the other 14 nominated examples of excellence.

Exploration of Methodologies

Not only is this dissertation an exploration into successful management approaches, it has also become an exploration of methodologies, moving from an initial quantitative focus toward a greater reliance on qualitative analytical techniques.

When I began this study, one of my original objectives was to use the survey data to measure "management approach" and "conservation value," and to determine the relationship, if any, between these two concepts.

Conservationists advocate that successful land management requires an "ecosystem management" or holistic, landscape-level approach. I wondered if the nominated examples of excellence were using such an approach. Based on current thinking in protected area management, I expected that sites using a holistic management approach would also have a higher conservation value. However, measurement of the concepts, "conservation value," and "management approach," proved both unreliable and invalid, and consequently could not be used to test the above hypothesis quantitatively.

Although many conservation value indices exist and I used the most common criteria, the concept has yet to be developed so as to allow reliable measurement across diverse groups of protected areas. This problem was demonstrated in the preliminary stages of my research where on several occasions managers gave conflicting responses when asked to judge the conservation value of a specific protected area.

The validity of the management approach index used in the survey also was inadequate. Based on the IUCN's management effectiveness checklist, (MacKinnon et al. 1986; see Appendix B, Q.17) this index measured *what* was being done at each case study, but not *how*, *why* or *with what emphasis*. A reductive, quantitative index -- that is, a measurement tool that produced a score -- failed to capture the complexity of successful small protected

area management. It also failed to capture the context and associated interplay between a protected area and its surrounding landscape matrix -- information important to this study.

However, while the management approach index used was inadequate for reliable quantitative analysis as planned, comments from managers indicated potential practical application of the index as a management audit tool. Consequently, the usefulness of the index as a management audit tool was explored in this study. In addition, I adapted the index and used it as a qualitative conceptual framework to compare systematically and objectively management approach at examples of excellence with the current thinking in protected area management. This strategy provided the opportunity to make a qualitative "test" of the hypothesis that examples of excellence would exhibit a landscape-level management approach (discussed in the Chapter 2). Here I use the term "hypothesis" to mean, "a statement whose truth can be rejected by counter example, by disproof, or by statistical evidence in favor of the contrary" (Krippendorf 1980:76).

In summary, the quantitative analysis would have yielded incomplete and possibly inaccurate information. Consequently, the research question was addressed primarily using qualitative methodologies. Qualitative analysis of interview transcripts and related management documents assessed staff perceptions of what worked and why certain actions were necessary to achieve successful management at a particular small protected area. Qualitative methodologies help maintain the holistic nature of case study data, especially the context of the system under study (Riley 1963; Smith 1988; Kloos 1988). Understanding context is important, especially in this study where ecological and social processes occurring beyond the artificial protected area boundaries are major determinants of ecosystem health (Machlis and Tichnell 1985; Odum 1986; Janzen 1986; Saunders et al. 1991; Einsiedel and Brown 1992).

THE STUDY AT A GLANCE

This introductory chapter provides background information bearing on the importance of small protected areas, it presents a rationale for studying small protected area management, reviews the general conservation status of small protected areas, and presents an overview of the methodological approach used to address the research question.

The following four chapters are written as individual papers. In Chapter 2, I review current thinking in conservation science literature, specifically as it pertains to protected area management. Based on this information, I then develop a conceptual framework that operationalizes "landscape-level management" -- the latest land management paradigm. Finally, I indicate how the conceptual framework will be used as one line of inquiry in this exploratory analysis of successful approaches in small protected area stewardship.

Chapters 3, 4 and 5 are based on case study analyses of a diverse set of small protected areas that were nominated as examples of excellence in conservation management. In Chapter 3, I present a broad look at characteristics associated with excellence in conservation management at 16 exemplary small protected areas. I then provide in-depth case study analyses of two of these examples of excellence, Ramsey Canyon Preserve (Chapter 4) and Mary's Point (Chapter 5). In my opinion, this detailed level of analysis provides the most useful understanding of excellence in small protected area stewardship because it provides a more holistic understanding of two successful management programs.

Research findings are reviewed and summarized in the final chapter, with suggestions for future studies in successful small protected area management .

LITERATURE CITED

- Allen, R.E.(ed). 1990. The Concise Oxford Dictionary of Current English. 8th ed. Clarendon Press, Oxford.
- Bogdan, R.C. and S.K. Biklen. 1992. Qualitative Research for Education: An Introduction to Theory and Methods. Allyn and Bacon, Toronto, Ontario.
- Brodtrick, O. 1988. Attributes of Well-Performing Organizations, Extract from the Report of the Auditor General of Canada. Ottawa, Ontario, Ministry of Supply and Services.
- Burgess, R.G. 1988. Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research. JAI Press, Greenwich, Connecticut.
- Butler, J. R. November 5, 1992, Personal communication.
- Carney, T.F. 1972. Content Analysis: A Technique for Systematic Inference from Communications. University of Manitoba Press, Winnipeg, Manitoba.
- Canadian Conservation Areas Data Base. 1991. State of the Environment Reporting, Environment Canada, Ottawa, Ontario.
- Cole, L. 1983. Urban nature conservation. Pp. 267-268 in A. Warren and F.B. Goldsmith, eds., Conservation In Perspective. John Wiley & Sons, Chichester, UK.
- Cole, D. 1991. Managing Wakama Valley. Pp. 126-127 in G.L. Holroyd, G. Burns, and H. C. Smith, eds., Natural History Occasional Paper No. 15 - Proceedings of the Second Endangered Species and Prairie Conservation Workshop, Provincial Museum of Alberta, Edmonton, Alberta.
- Diamond, J.M. 1975. The island dilemma: lessons of modern biogeographic studies for the design of natural reserves. *Biological Conservation* 7:129-146.
- di Castri, F. and J. Robertson. 1982. The biosphere reserve concept: 10 years after. *Parks* 6(4):1-6.
- Dillman, D.A. 1978. Mail and Telephone Surveys: The Total Design Method. John Wiley & Sons, New York, New York.
- Eagles, P. 1993. Environmental Management in Parks. Pp. 154-184 in P. Dearden and R. Rollins, eds., Parks and Protected Areas in Canada: Planning and Management. Oxford University Press, Toronto, Ontario.
- Eidsvik, H. 1989. Canada in a global context. Pp. 30-45 in M. Hummel ed., Endangered Spaces: The Future for Canada's Wilderness. Key Porter Books, Ltd., Toronto, Ontario.
- Epp, H.T. 1991. Ecological process management for maintaining biological diversity on the Canadian prairies. Pp. 72-77 in G.L. Holroyd, G. Burns, and H. C. Smith, eds., Natural History Occasional Paper No. 15 - Proceedings of the Second Endangered Species and Prairie Conservation Workshop, Provincial Museum of Alberta, Edmonton, Alberta.

- Fisher, A.C. 1982. *Economic Analysis and Extinction of Species*. Department of Energy and Resources, University of California, Berkeley, California.
- Fowler, F.J. 1988. *Survey Research Methods*. Applied Social Research Methods Series Volume 1. Sage Publications, Beverly Hills, California.
- Glaser, B.G. and A.L. Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine de Gruyter, Hawthorne, New York.
- Grosf, M.S. and H. Sardy. 1985. *A Research Primer for Social and Behavioral Sciences*. Academic Press, Toronto, Ontario.
- Grumbine, R.E. 1994. What is ecosystem management? *Conservation Biology* 8(1):22-38.
- Harris, L.D. 1984. *The Fragmented Forest: Island Biogeography Theory and the Preservation of Biotic Diversity*. The University of Chicago Press, Chicago, Illinois.
- Hjertaas, W. 1991. The Yorkton Ecological Preserve. Pp. 128-129 in G.L. Holroyd, G. Burns, and H. C. Smith, eds., *Natural History Occasional Paper No. 15 - Proceedings of the Second Endangered Species and Prairie Conservation Workshop*, Provincial Museum of Alberta, Edmonton, Alberta.
- House, E.R. 1980. *Evaluating with Validity*. Sage Publications, Inc. Beverly Hills, California.
- International Union for Conservation of Nature and Natural Resources. 1980. *World Conservation Strategy*. IUCN, Gland, Switzerland.
- International Union for Conservation of Nature and Natural Resources. 1990. *1990 United Nations List of National Parks and Protected Areas*. IUCN, Gland, Switzerland and Cambridge, UK.
- Lusigi, W.J. 1988. The new resources manager. Pp. 42-51 in Vance Martin ed., *For the Conservation of Earth*. International Wilderness Leadership Foundation, Fulcrum Inc., Golden, Colorado.
- Lyon, T.J. (ed). 1989. *This Incomparable Land: A Book of American Nature Writing*. Penguin Books, Markham, Ontario.
- MacClintock L, R.F. Whitcomb, and B.L. Whitcomb. 1977. Evidence for the value of corridors and minimization of isolation in preservation of biotic diversity. *American Birds*. 31:6-16.
- MacKinnon, J. and K. MacKinnon. 1986. *Review of the Protected Areas System in the Indo-Malayan Realm*. Prepared for the International Union for Conservation of Nature and Natural Resources - Commission on National Parks and Protected Areas in collaboration with the United Nations Environment Programme.
- Mader, H.J. 1984. Animal habitat isolation by roads and agricultural fields. *Biological Conservation* 29:81-96.

- McNeely, J.A. and J. Thorsell. 1991. Guidelines for preparing protected area system plans. *Parks* 2(2):4-8.
- Newmark, W.D. 1985. Legal and biotic boundaries of western North American national parks: a problem of congruence. *Biological Conservation*. 33:197-208.
- Natural Science for Youth Foundation. 1990. Directory. Natural Science Centers. Roswell, Georgia.
- Nature Conservancy Canada. 1992. Compilation of Nature Conservancy Projects 1963-1992. Nature Conservancy Canada, Toronto, Ontario.
- Noss, R.F. 1983. A regional landscape approach to maintain diversity. *BioScience* 33:700-706.
- Noss, R.F. 1987. Protecting natural areas in fragmented landscapes. *Natural Areas Journal* 7(1):2-13.
- Peters, T.J. and R.H. Waterman, Jr. 1982. *In Search of Excellence: Lessons From America's Best-Run Companies*. Warner Books, New York, New York.
- Platt J. 1988. What Can Case Studies Do? Pp. 1-23 *in* R. G. Burgess ed. *Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research*. JAI Press. Greenwich, Connecticut.
- Prescott-Allen, R. and Prescott-Allen, C. 1981. *In situ conservation of crop genetic resources*. IBPGR and IUCN.
- Rapport, D.J. 1989. What constitutes ecosystem health? *Perspectives in Biology and Medicine* 33:120-132.
- Reid W.V. and K.R. Miller. 1989. *Keeping Options Alive: The Scientific Basis for Conserving Biodiversity*. World Resources Institute, Washington, DC.
- Riley, M.W. 1963. *Sociological Research: A Case Approach*. Harcourt, Brace and World, Inc. New York, New York.
- Rowe, J.S. 1988. Landscape ecology: the study of terrain ecosystems. Pp. 35-42 *in* M.R. Moss, ed. *Landscape Ecology and Management*. Polyscience Publications Inc., Montreal, Quebec.
- Rubec, C.D.A., A. Turner, N. Chartrand, and E.B. Wiken. 1990. *Conserving Canadian ecosystems: a systems approach*. Canadian Council on Ecological Areas. Occasional Paper No. 10. Compiled by J. R. Reid.
- Rubin, H. J. 1983. *Applied Social Research*. Charles E. Merrill Publishing, Toronto, Ontario.
- Rubec, C.D.A., A. Turner, N. Chartrand, and E.B. Wiken. 1990. *Conserving Canadian ecosystems: a systems approach*. Canadian Council on Ecological Areas. Occasional Paper No. 10. Compiled by J. R. Reid.

- Sargent, F.O., and J.H. Brande. 1976. Classifying and evaluating unique natural areas for planning purposes. *Journal of Soil and Water Conservation* 31:113-116.
- Saunders D.A., R.J. Hobbs and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: a review. *Conservation Biology* 5(1):18-34.
- Schonewald-Cox, C.M. 1983. Guidelines to management: a beginning attempt. Pp. 414-445 in Schonewald-Cox et al. eds., *Genetics and Conservation: A Reference for Managing Wild Animal and Plant Populations*. The Benjamin/Cummings Publishing Co., Inc., Menlo Park, California.
- Shafer, C.L. 1990. *Nature Reserves: Island Theory and Conservation Practice*. Smithsonian Institution Press, Washington.
- Sheail, J. 1976. The acquisition and management of nature reserves. *Nature in Trust: The History of Nature Conservation in Britain*. Blackie and Sons Ltd., London.
- Simberloff, D., and N. Gotelli. 1984. Effects of insularization on plant species richness in the prairie-forest ecotone, *Biological Conservation* 29:27-46.
- Smith, L.M. 1988. Broadening the base of qualitative case study methods in education. Pp. 28-33 in R. G. Burgess ed. *Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research*. JAI Press. Greenwich, Connecticut.
- Snyder, G. 1990. *The Practice of the Wild*. North Point Press.
- Soulé, M.E. and D. Simberloff. 1986. What do genetics and ecology tell us about the design of nature reserves? *Biological Conservation*. 35:19-32.
- Spradley, J.P. 1979. *The Ethnographic Interview*. Holt, Rinehart, and Winston, New York.
- Stake, R.E. and J. A. Easley et al. 1978. *Case Studies in Science Education. Volume II. Design, Overview and General Findings*. Center for Instructional Research and Curriculum Evaluation. University of Illinois.
- Strauss, A.L. 1987. *Qualitative Analysis for Social Sciences*. Cambridge University Press, Cambridge.
- Tanner, J. 1990. Reluctant rebels: a case study of Edmonton high school drop-outs. *Canadian Review of Sociology and Anthropology*. 27(1):74-94.
- The Nature Trust of British Columbia. Project List 1971-1990. The Nature Trust of Alberta, West Vancouver, British Columbia.
- Theberge, J.B. 1993. Ecology, conservation, and protected areas in Canada. Pp. 137-153 in P. Dearden and R. Rollins, eds., *Parks and Protected Areas in Canada: Planning and Management*. Oxford University Press, Toronto, Ontario.
- Towl, A.R. 1969. *To Study Administrations by Cases*. Harvard University Business School, Boston, Massachusetts.

- University of California, Natural Reserve System. Natural Reserve System Annual Report 1987-88.
- Webb, C. 1987. Reserves for nature. ECA 88-PA/CS-S1. Environmental Council of Alberta, Edmonton, Alberta.
- Wetterberg, G.B., Prance, G.T. and Lovejoy, T. 1981. Conservation progress in Amazonia: a structural review. *Parks* 6(2):5-10.
- Whitcomb, R.F., C.S. Robbins, J.F. Lynch, B.L. Whitcomb, M.K. Klimkiewicz, and D. Bystrak. 1981. Effects of forest fragmentation on avifauna of the eastern deciduous forest. Pp. 125-205 in R.L. Burgess and D.M. Sharpe, eds., *Forest Island Dynamics in Man-dominated Landscapes*. Springer-Verlag, New York.
- Whyte, W.F. 1955. *Street Corner Society: The Social Structure of an Italian Slum*. University of Chicago Press, Illinois.
- Wicken, E.B. and K. Lawton. 1995. North American protected areas: an ecological approach to reporting and analysis. *The George Wright FORUM* 12(1): 25-34.
- Wilcove, D.S., C.H. McLellan and A.P. Dobson. 1986. Habitat fragmentation in the temperate zone. Pp. 237-256 in M.E. Soulé, ed., *Conservation Biology: The Science of Scarcity and Diversity*. Sinauer Associates, Inc., Sunderland, Massachusetts.
- Wilcox, B.A., and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. *American Naturalist*. 125:879-887.
- Yin, R. K. 1988. *Case Study Research: Design and Methods*. Sage Publications. Newbury Park, California.

CHAPTER 2

CONSERVATION MANAGEMENT OF ECOLOGICAL FRAGMENTS - SMALL PROTECTED AREAS

INTRODUCTION

Not long ago, no single species dominated North America's landscape. Today, as human population grows exponentially, and technological impacts escalate both spatially and temporally, nature is rapidly being replaced with roads, buildings, monocultures, clear-cuts, seismic lines, and other alien landscape modifications. Massive landscape fragmentation is the result.

Fragmentation is a physical statement of our relationship with the land (Maser 1990). Fragmentation reflects an obvious lack of consideration of the needs of non-human life and sometimes the needs of other humans. Large-scale disruptions of the landscape also reflects an unawareness that landscape health is the foundation of human health (Karr 1992; Orr 1992). To compound the problem, many North Americans fail even to distinguish unhealthy from healthy landscapes. In the words of David Orr (1992:87):

[w]e have become comfortable with all kinds of ugliness and seem incapable of effective protest against it purveyors . . . But disordered landscapes are not just an aesthetic problem. Ugliness signifies a more fundamental disharmony between people and between people and the land. Ugliness is, I think, the surest sign of disease, or what is now being called "unsustainability."

In North America's largely anthropocentric culture, non-human nature often is perceived as having no intrinsic worth. Nature's existence is justified if it fulfills a human need. As a consequence, landscapes cease to be celebrated as living communities. Instead, they are degraded into isolated natural resources to be dominated, manipulated, and used for human benefit (Sessions 1983). This predominantly utilitarian attitude, combined with technological "progress," is the root cause of landscape fragmentation.

Landscape fragmentation, and its associated ecological effects (increased external disturbances combined with decreased resilience) and sociological consequences (increased separation of people from natural ecosystems), creates serious obstacles to effective

protected area management. As will be shown, these problems are magnified for small protected areas. It is for this reason, that I seek to answer the question: "What are successful management approaches for small protected areas?"

As a preliminary step toward understanding successful management of ecological fragments -- small protected areas -- I first review current thinking in conservation science literature, specifically as it pertains to landscape fragmentation and its implications for protected area management. Based on this information, I then develop a conceptual framework that operationally defines "landscape-level management" -- the current land management paradigm. Finally, I indicate how this conceptual framework can be used as one line of inquiry into successful approaches in small protected area stewardship.

THE PROBLEM: LANDSCAPE FRAGMENTATION

Landscape fragmentation is defined as any human landscape modification that *artificially dissects* an ecosystem, or mosaic of ecosystems, causing loss of intrinsic features, isolation of components within the once contiguous landscape, and disruption of natural processes (Harris and Gallagher 1989; Crow 1991; Theberge 1993). Fragmentation is caused by activities such as trail, parking lot, road, railway, residential, pipeline, dam, and seismic line construction; and by uses of the land such as monoculture agricultural or forestry. Crow (1991:63) provides a useful comparison between natural and fragmented landscapes:

[n]atural landscapes tend to have high connectiveness among matrix elements. High variation in patch size is also the norm, with many small patches and a few large patches present. While sharp, abrupt edges do occur in natural landscapes, gradual or "soft" edges and low contrast among landscape elements are common.

In contrast, the matrix in human-dominated landscapes is likely to be fragmented into smaller patches, with the patches becoming regular, more geometric in shape when compared to the natural landscape. Large habitat patches are lost. Fragmentation results in low connectiveness in the human-dominated landscape and high contrast among patches is a common feature.

Ecological Impacts of Landscape Fragmentation

What are the problems created by landscape fragmentation? The result of landscape fragmentation is "a landscape that consists of remnant areas of native vegetation surrounded by a matrix of agriculture or other developed land. As a result, fluxes of radiation, momentum (i.e., wind), water, and nutrients across the landscape are altered significantly"

(Saunders et al. 1991:18). Landscape fragmentation has been identified as, "the most serious threat to biological diversity and is the primary cause of the present extinction crisis" (Wilcox and Murphy 1985). Landscape fragmentation causes negative impacts to ecological processes and wildlife species via habitat loss, isolation, and alteration.

Habitat Loss

Fragmentation of contiguous landscapes causes direct loss of habitat. Obligatory nomadic species and animals with large home-range requirements, such as many top carnivores, are obvious losers when large tracts of land are fragmented into small isolated habitat patches (Wilcox 1980; Harris 1984; Harris and Gallagher 1989; Harris and Eisenberg 1989; Theberge 1989). Species numbers are directly related to habitat size. Consequently, as the total area of land decreases, loss of species increases proportionately (Diamond 1975; McLellan et al. 1986; Leveson 1987).

Habitat Isolation

A second outcome of landscape fragmentation is habitat isolation. In healthy, contiguous landscapes, flow of energy and matter is unimpaired. Clear-cuts, roads, and even hiking trails can block normal energy and matter flows; for example, by disrupting species dispersal patterns (Mader 1984; Yahner 1988). The greater the isolation (that is, distance between natural areas), the lower the rate of species re-colonization. Thus isolation causes reduced gene flow and may severely impair a population's reproductive success (Pickett and Thompson 1978; Mader 1984). Species with large area requirements and species with low dispersal capabilities will be most seriously affected by habitat isolation. Crow (1991:64) indicates that fluxes in organisms, nutrients, and energy "profoundly affect the composition, structure, and function" of a landscape patch.

Habitat Alteration

Habitat alteration of an ecological fragment is the result of a phenomenon known as the "edge effect" (Yahner 1988; Laurance and Yensen 1991; Harris and Gallagher 1989). Edge effect, in a forest ecosystem, may include: alteration of forest habitat interiors by increasing wind (Wales 1972; Reville et al. 1990); increasing sunlight exposure (Wales 1972); and permitting invasion of species that are not dependent on interior forest habitats, known as "edge species" (Wilcox 1980; Soulé and Simberloff 1986; Temple and Carey 1988; Hickman 1990). Invasion of edge species results in amplification of competition (Janzen 1986), predation (Andren and Angelstam 1988), and brood parasitism (Temple and

Carey 1988). The net effect may be displacement, and possible extirpation, of other species (Yahner 1988; Harris 1988).

The micro-climatic changes caused by increased wind and sunlight may create environments unsuitable for habitat specialists. Flora and fauna with low dispersal capabilities are most affected by habitat change. If habitat change is compounded by isolation, species extirpation may occur.

The degree of habitat alteration caused by fragmentation is dependent on the cause of fragmentation (e.g. a four lane highway versus a hiking trail). The second factor determining degree of habitat disturbance is distance from the fragmenting force (Harris 1984). As shown in Figure 2.1, habitat alteration caused by a road can extend into forest interiors up to 500 or 600 meters from the site of disturbance, with the severest disturbances occurring in the first 200 meters (Wilcove et al. 1986). Thus, forest remnants less than 100 hectares in size, may contain no true forest interior birds (Robbins 1991). Due to surface to area relationships, long narrow habitat patches are more susceptible to edge effects, than are large circular ones (Diamond 1975).

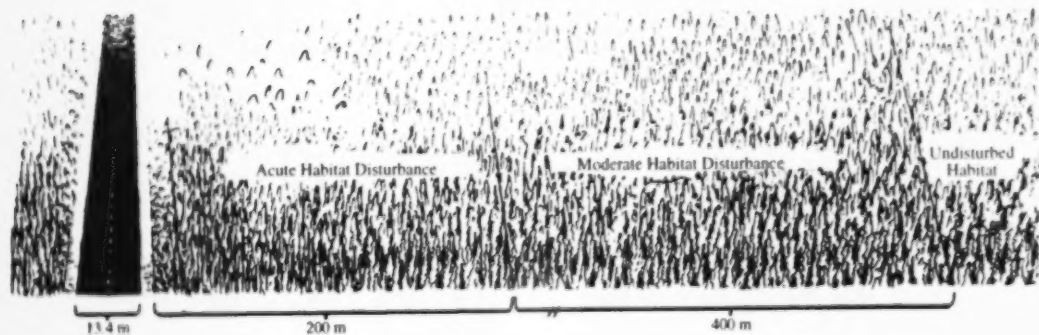


Figure 2.1 Degree of habitat disturbance of a forest ecosystem caused by road construction.

In summary, landscape fragmentation reduces ecological viability through changes in ecological structure (loss of species) and changes in ecological functions (energy and matter flows). Fragmentation has the greatest impact on species with large area requirements,

species with poor dispersal capabilities, and species with low tolerance to habitat changes (Therberge 1993).

Sociological Impacts of Landscape Fragmentation

In addition to the above ecological impacts of landscape fragmentation, there are negative sociological implications. Landscape fragmentation segregates and alienates people from the land, numbing people to natural life rhythms and to essential ecological understandings (Devall and Sessions 1985; Snyder 1990). Stan Rowe (1990:68) asserts that, "the built environment acts as a filter and barrier that 'progress' renders thicker and more opaque, gradually eliminating and shutting off nature's direct sensual stimuli." Whether people are alienated from or integrated into our landscapes will in turn will determine how society values and interacts with non-human nature, and thus how society values and treats protected areas.

Combined, these ecological and sociological impacts create serious obstacles to effective protected area management. Scientists and practitioners in conservation-related fields suggest that a landscape-level approach to land management can begin to counteract these obstacles.

THE SOLUTION: LANDSCAPE-LEVEL MANAGEMENT APPROACH

If fragmentation is a major threat to healthy landscapes and healthy living, society must begin the process of healing severed landscapes and severed bonds between humans and other life forms. A landscape-level approach to protected area management is an essential part of this harmonization process.

For over three decades it has been recognized that protected areas should be integrated into, rather than isolated from, their surrounding ecological and socio-economic region (UNESCO 1988). Variations of a holistic, integrated approach to land management, such as "regional landscape approach" (Noss 1983); Man and the Biosphere Program (UNESCO 1984); "multiple-use module" (Harris 1984); "ecosystem management" (Agee and Johnson 1988) and "holistic resource management" (Savory 1991) -- to name a few -- continue to be advocated. In this paper, I use the term "landscape-level management" to encompass all of the above names given to holistic management approaches.

Why "landscape-level" and not "ecosystem-level" management? As Godron and Forman (1983: 12) comment:

[t]he ecosystem concept is used widely, but often ambiguously, in the world's literature, because (a) for some ecologists it has only a functional meaning, (b) for others it also has a spatial connotation, which includes any level of scale, e.g. from a rabbit pellet to the biosphere, and (c) for others the spatial aspect is included, but additionally, relative homogeneity must characterize the ecosystem.

In contrast, "landscape-level management" implies focus on larger, highly heterogeneous land units and such a focus is a defining characteristic of holistic stewardship.

Landscape-level management is a holistic, adaptive, co-operative approach that addresses ecological and socio-economic factors, both within and outside protected area boundaries. It is based on the recognition that protection of rare species, restoration of a threatened ecosystem, or maintenance of an ecological function (such as species migration) requires a broad spatial and temporal focus. For example, we need to review traditional ecological knowledge, to understand, as best we can, vital ecological processes (geological phenomena, fires, floods, and climate) which gave rise to current ecological situations. And we need to think about how past, present and possible future human activities influence these life sustaining processes. Understanding relationships between vital ecological processes, human activities and specific management concerns determines at what spatial level we need to focus management efforts. For example, in Figure 2.2, depicting landscape changes over space and time, if the large wetland is critical to health of the natural area, then management efforts need to focus, not on the natural area itself, but on ensuring long-term protection of this wetland, or perhaps, on the larger watershed.

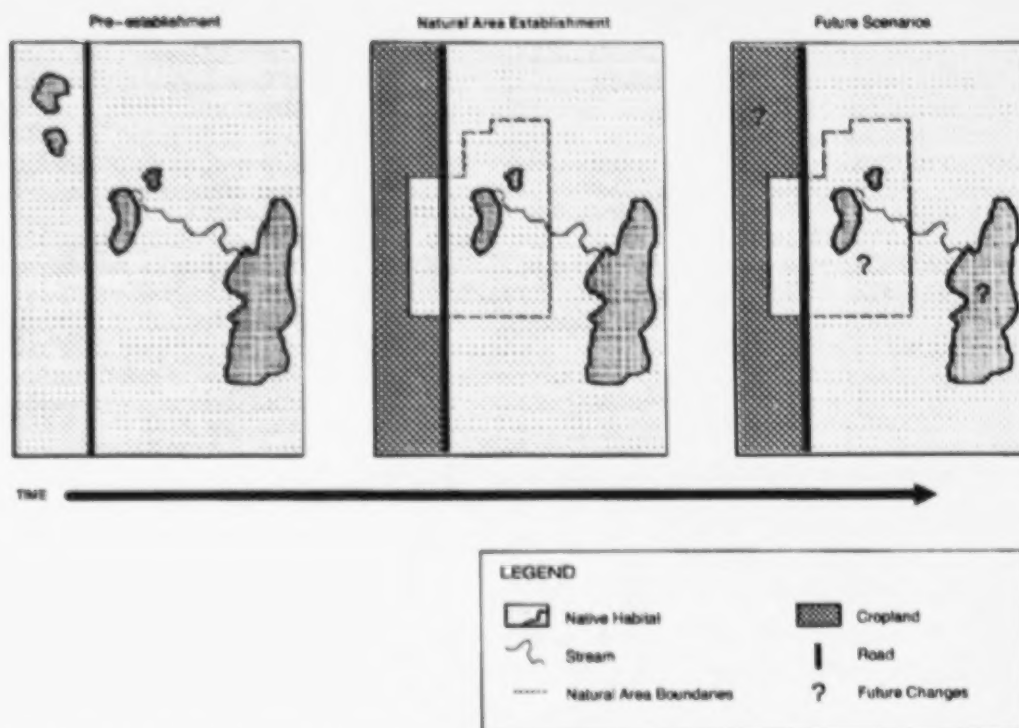


Figure 2.2 Landscape changes over time and space.

The underlying philosophy of holistic stewardship is that long-term survival of protected areas is dependent upon the understanding and support of communities living within or near protected areas. This support can be gained through partnerships with landowners, research institutes and other resource management agencies; through active public participation in establishment and management of protected areas; and through mechanisms which allow local communities to benefit both socially and economically from the existence of protected areas (Ugalde 1989). In addition, "linking protected areas together with human needs can support ecologically sound development which takes on practical meaning for governments and local people" (McNeely 1989:156). In summary, a holistic approach strives to integrate protected area objectives into the cultural fabric so that conservation becomes a part of the culture, "rather than a discrete responsibility of wildlife or national parks departments" (McNeely 1989:157).

RATIONALE FOR A LANDSCAPE-LEVEL APPROACH

The need for a landscape-level management approach for small protected areas is evident from the nature of threats to small protected areas, insights from landscape and human ecology, and the attributes of landscape fragments.

Threats to Protected Areas

Evidence supporting the need for integrated management was shown in a recent University of Alberta study (Brown et al. , 1992; Einsiedel and Brown 1992). The most commonly reported direct and indirect threats to long-term ecological viability (defined as the "maintenance of ecosystem components and healthy functioning of key ecological processes") at small protected areas were: (1) inadequate internal resource management (funding and staff); (2) human encroachment (urbanization and industrial/agricultural activities); (3) human abuse and misuse of the protected area; and (4) exotic species invasion (Figure 2.3). These results suggest that the most serious block to developing an ecologically viable system of protected areas is the widespread lack of society's appreciation, understanding and support of these sites and wildlands in general. Of significance is the widespread under-allocation of financial and human resources given to protected area agencies. This in turn may have negative ripple effects in terms of the management's ability to properly protect land under its jurisdiction.

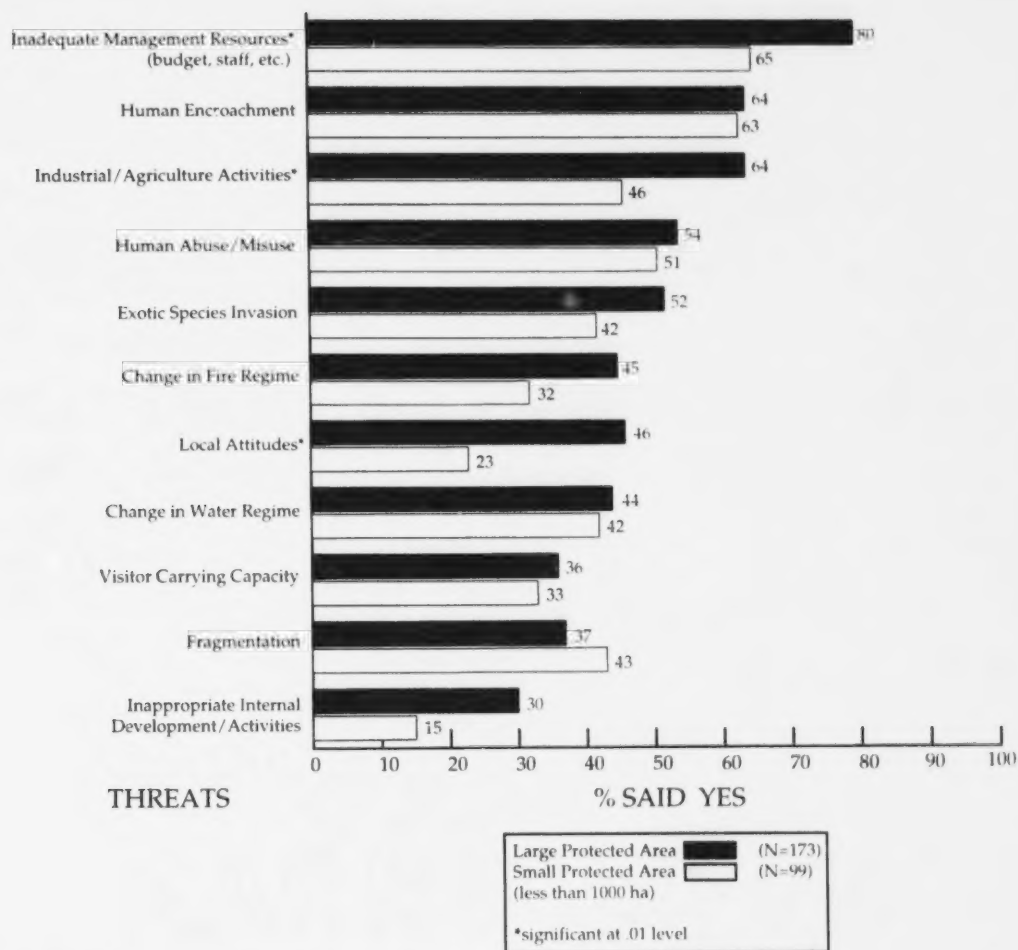


Figure 2.2 Commonly reported threats to ecological viability of small and large protected areas (Source: Brown et al. 1992).

Similarly, in an international study on the state of the world's parks, Machlis and Tichnell (1985) identified threats originating from incompatible activities on adjacent lands as being the most serious problems facing protected area managers today. MacKinnon and MacKinnon (1986:9) agree, stating that human-caused threats such as poaching, fire policies, forest clearing "are more important" and therefore "obscure biogeographical phenomena." Studies of threats to protected areas provide empirical evidence for the importance of understanding the larger landscape context and accordingly, focusing management efforts beyond the artificial reserve boundaries. Saunders et al. (1991:26)

concur, stating that 'for small remnants, on the other hand, management should be directed primarily at controlling the external influences.'

Insights from Landscape and Human Ecology

The Landscape Context

To speak of landscape fragmentation implies that the landscape is a holistic entity. This is a fundamental assumption of the relatively new scientific discipline -- landscape ecology. According to landscape ecologists, landscapes can only be understood by viewing them as holistic entities - complex, open, dynamic mosaics rather than collections of isolated, static resources (Zonneveld and Forman 1990). Landscape ecology has been defined as the study of landscape change. Studies in landscape ecology focus on spatial and temporal interconnections within the landscape mosaic, with particular attention given to matter and energy flows (Turner 1989; Turner and Gardner 1991).

With a landscape ecologist's perspective then, protected areas are recognized as open, dynamic systems functioning within a larger regional system of landscape patterns, processes and land-uses. Accordingly, what happens "outside" the protected area boundaries, is a major determinant of successful protected area management.

The legislated boundaries of a protected area are of course artificial and rarely correspond to ecological boundaries, even for the largest parks (Newmark 1985; Harris and Gallagher 1989). What happens outside the boundary, whether it be disruptive (such as pollution) or beneficial (such as protection of critical habitats by local landowners), will influence the protected area's ecological viability. For example, the landscape context of an ecological fragment, will determine both re-colonization rates and it also determines what species will colonize the fragment. The change in population densities and species composition, then influences resource availability, species interactions, and population viability (Lovejoy et al. 1986; Janzen 1986). Some conservationists suggest that, what happens in the regional setting, is more important than what is happening within the preserve (Harris and Gallagher 1989).

Taking a large spatial and temporal perspective is essential to understanding a protected area's context and to understanding or at least recognizing, the key interactions between the protected area and its regional context. The regional context has both ecological and

sociological dimensions. Research in human ecology takes a closer look at the sociological dimensions, that is, the human factor in the landscape context.

The Human Factor

Humans greatly influence landscape patterns, processes and land-uses, and therefore human activities are central determinants of landscape health. Studies in human ecology have focused on human influences on protected area systems (Catton 1970; Machlis et al. 1981; Machlis and Tichnell 1985; McNeely 1989; Nelson 1991; and others).

Of relevance to this study is the protected area ecosystem model developed by Wright and Machlis (1984). This model identifies subsystems within a protected area (air, water, soil, vegetation, fauna, cultural resources, visitors, and support infrastructure), the processes connecting these internal subsystems, and the linkages between the protected area and the larger regional ecosystem. From the protected area ecosystem model, three things are apparent.

First as with landscape ecology, protected areas are recognized as open, dynamic systems in constant interaction with the surrounding landscape. Dynamic systems require a dynamic, adaptive management approach (Agee and Johnson 1988). Ongoing monitoring and management evaluation are required to determine protected area and regional responses to management actions.

Secondly, the protected area ecosystem model demonstrates that protected areas and the surrounding bioregion are complex systems that require complex, holistic management approaches. Dealing with a single species or subsystem in isolation from the others is likely to cause problems. This is not to say that all linkages must be known, but rather key linkages should be identified (Johnson and Agee 1988). Moreover, the complexity of protected area ecosystems and their dependency on the health of the land-water mosaic in which they function, demands cooperation and networking among many sectors of society, from scientists to local community members. Successful protected area management is no longer considered a single person or agency endeavor (Lusigi 1988).

Thirdly, humans are identified as a significant part of the protected area ecosystem. Accordingly, the following factors need to be considered in protected area establishment and management plans: (1) population demographics; (2) economic and political policies;

(3) past, present, and expected land-use patterns; and (4) local community characteristics. The sociological context of a protected area is an essential part of landscape context. Hence its inclusion in management efforts is paramount to successful stewardship of ecological fragments (Schonewald-Cox and Bayless 1986).

Applying principles in human ecology, one then sees that the protected area is not a self-contained unit. Rather it is an incomplete system "embedded in a wider regional ecosystem that is influenced by the population, organization, technology and environment that surround and interact with it" (Machlis and Tichnell 1985:32). When protected area is managed in isolation from its regional context, there can be negative socio-economic consequences. For example, protected areas managed as islands separate from society are sometimes viewed as "as distant, pretty places for tourists, scientists, and biologists" or as "locked-up resources" and associated conservation goals are seen to be anti-development strategies (Lusigi 1988; McNeely 1989; Ugalde, 1989). Another harmful perception is that protected areas are merely playgrounds or protected paradises. Machlis and Tichnell (1985) suggest this romantic vision of parks is widespread and represents a serious threat to conservation goals. A landscape-level management approach, that integrates conservation with regional needs, and thereby develops public and political support, is essential to successful land management (Thomas and Salwasser 1989).

Attributes of Landscape Fragments

A final reason for an ecologically and socially integrated stewardship approach is provided with a closer examination of the attributes of landscape fragments. Saunders et al. (1991) comment that the impacts of landscape fragmentation "are modified by the size, shape, and position in the landscape of individual remnants, with larger remnants being less adversely affected by the fragmentation process. As will be shown, landscape-level management is imperative for small protected areas.

Regardless of how connected a small protected area is to the landscape matrix, a manager only has "control" within the legally designated boundaries; hence, all small protected areas are essentially landscape fragments. Consequently, effective small protected area management requires an understanding of the ecological attributes of landscape remnants. There are three attributes of an ecological fragment that determines how it functions within

the landscape matrix and therefore determines its ecological viability: shape, connectivity, and size.

Shape

Although not an important determinant of ecological viability for large tracts of land, shape is an important attribute of ecological fragments (Saunders et al. 1991). Diamond (1975) and others suggest that circular fragments are superior to all other shapes because they possess the lowest possible perimeter length to fragment area ratio. The ratio of perimeter length to core area is important because it allows for an estimate of the exposure of the protected area core to edge effects. Forman and Godron (1986:264) indicate that, "edge effects are especially powerful forces when fragments are small or irregularly shaped." Consequently, there is a need to round-out small, irregularly shaped protected areas. This "rounding-out" can be achieved through land acquisition, or more probably, through co-operative management efforts with owners of adjacent lands.

Connectivity

The degree to which an ecological fragment is connected with the landscape matrix is a major determinant of its ecological viability. In fragmented landscapes, movement of individuals, species, nutrients, and energy is impaired. Migration of species between fragments depends on distance between fragments and characteristics of the intervening matrix. Plant gene flow between fragments may be severely impaired even by short distances (Levin and Kerster 1974). For animals, organism size and behavior are important. For example, ten meters is a movement barrier to some insects (Mader 1984).

Connectivity can be enhanced through the maintenance or creation of corridors. Although the concept of corridors as a tool for enhancing ecological viability has been criticized (Simberloff and Cox 1987), it is generally believed that maintaining landscape connections, or re-connecting broken landscapes, is beneficial (MacClintock et al. 1977; Suckling 1982; Harris 1984; Noss 1987b; Harris and Sheck 1991). Landscape connectivity can be regained through inter-agency co-operation and working with neighbors. Harris (1984) and Salwasser et al. (1987:26) describe the need for interagency management strategies to maintain or to re-establish landscapes that are "sufficiently large to maintain viable populations and mitigate the problems of isolated parks."

Size

External influences are of particular importance to the ecological viability of small protected areas. For example, Saunders et al.(1991) indicated that ecological processes (e.g. biogeochemical cycles and energy flow) within small ecosystems tend to be "externally driven" and Odum (1986) stated that the smaller the ecosystem, the more sensitive it is to external forces. Furthermore, Noss (1987a:5) states that, "smaller reserves with larger perimeter-area ratios have proportionately greater management problems resulting from interactions with the surrounding landscape and its human and non-human inhabitants." Thus, the need to have a landscape perspective, to be cognizant of the ecological and socio-economic systems in which the small protected areas functions, to identify external threats, and to work co-operatively with local communities and governments to minimize these threats, is magnified for stewards of small protected areas. The effective size of small protected areas can be increased through a system of buffers and corridors (Harris 1984).

The conclusion is clear: for effective management of ecological fragments, a landscape-level management approach is needed to enlarge, round-out and re-connect habitat patches, and importantly to re-connect people with natural places to develop a citizenry more supportive of conservation objectives.

The attributes of a small protected area (shape, connectivity and size), and the ecological condition of it's landscape context (natural or human-dominated), determine the protected area's long-term ecological viability, and thus its contribution to conservation goals. A fundamental assumption of this research is that management approach can positively or negatively influence both site and context conditions.

LANDSCAPE-LEVEL MANAGEMENT APPROACH - A CONCEPTUAL FRAMEWORK

As was noted in the introduction, the concept of a holistic, integrated management approach has been advocated by scientists and practitioners for nearly three decades. Not surprisingly, then, there is a substantial body of information pertaining to a holistic management paradigm. However, as noted, much of the literature deals with large protected areas, and to my knowledge, there are no broad-based, case study analyses examining overall successful management approaches for small protected areas. In

addition, the current thinking in protected areas management is in a state of flux (Grumbine 1994), and this paradigm continues to evolve as knowledge in conservation sciences expands and modern societies begin to acknowledge the age-old wisdom of traditional societies (Goldsmith 1993).

Although variations of a landscape-level management approach for protected area management has been advocated for many years, its conceptualization has yet to gain widespread consensus. For instance, Grumbine (1994:27) comments, "the evolving concept of ecosystem management is the focus of much debate."

To build on the extant literature as it pertains specifically to managing ecological fragments, I therefore used an analytical approach that combines both deductive and inductive methodologies. Such an approach is the most appropriate one for addressing the research question: What are successful management approaches for small protected areas? Deductive analysis allows comparison with extant literature in protected area management, while the inductive permits an original examination into the challenge of managing ecological fragments. In the following section, I discuss development of a conceptual framework which defines landscape-level management, thus permitting deductive analysis of successful management approaches for small protected areas.

I wanted to know if, or to what degree, small protected areas nominated as examples of excellence in conservation management, used a landscape-level approach. Based on the above literature review, I expected to find the use of this approach common at exemplary small protected areas. To test this hypothesis, I "operationalized" the landscape-level management approach by developing a conceptual framework (Table 2.1). Here I use the term "hypothesis" according to Krippendorf's definition, "a statement whose truth can be rejected by counter example, by disproof, or by statistical evidence in favor of the contrary" (1980:76).

The framework is based on an International Union for Conservation of Nature and Natural Resources (IUCN), or World Conservation Union, management effectiveness checklist produced by an international group of experts in protected area management (MacKinnon et al. 1986). These experts state that effective protected area management should ensure that activities are socio-economically acceptable, politically feasible, and ecologically desirable -- three key features of landscape-level conservation.

The original IUCN checklist includes both indicators of effectiveness and actions considered important to successful land stewardship; the framework I developed includes only the latter. I then compared the framework with a wide selection of relevant literature in protected area management to verify its validity in conceptualizing "landscape-level management approach." Some supporting references are presented in Table 2.1.

Table 2.1 Conceptual framework for a landscape-level management approach.

THEORETICAL LANDSCAPE-LEVEL MANAGEMENT APPROACH		Supporting References
Adapted from MacKinnon et al. 1986		
Research across large spatial and temporal scales		Basic management Zonneveld and Forman 1990; Johnson and Agee 1988; Dyer and Holland 1991
Basic resource inventories		Ruzicka and Miklos 1990; Goulet 1990
Socio-economic information (local needs and concerns; threats to protected area)		Schonewald-Cox and Bayless 1986; Manning 1990; Shafer 1990; Noss 1987; McNeely 1989; Ruzicka and Miklos 1990; Harris and Eisenberg 1989
Ecological studies (natural and unnatural disturbance regimes), including human ecology (effects and consequences of human activities on the landscape)		Crow 1991; Ruzicka and Miklos 1990
Opportunities for outside researchers		
Planning across large spatial and temporal scales		Basic management Allen and Starr 1982
Regional system plan, identifying mosaic of land patterns, processes and uses		Noss 1987; Shafer 1990; Forman 1987; Noss 1987a; Crow 1991; Ruzicka and Miklos 1990; Harris 1984.
Written management plan		Goodier and Jeffers 1981; Goulet 1990
Specific, measurable objectives		Goodier and Jeffers 1981; Schroeder and Keller 1990; Goulet 1990; Crow 1991
Research plan that supports management objectives		

Public participation in planning		Ugalde 1989
Implementation across at large spatial and temporal scales		Basic management
Implemented management plan		Basic management
Financial program		Basic management
Maintenance program		Basic management
Land acquisition and/or landowner contact program, to enlarge, round out and re-connect ecological fragments		Noss 1987a; Harris and Gallagher 1989, Caza 1993
Ecological restoration program		di Castri and Robertson 1982; Poulin and Eidsvik 1979
Mechanism for regular communication with local community		Janzen 1986; Ugalde 1989
Volunteer program		Extensive literature
Mechanism to involve surrounding landowners		Janzen, 1986; Noss 1987; Goulet 1990; Caza 1993
Mechanism to contribute to local economy		McNeely 1989
Mechanism to facilitate co-operation with other agencies and institutions		Harris and Gallagher 1989, Noss 1987a; Goulet 1990
Mechanism to allow public involvement in decision making		Ugalde 1989
Visitor management program		Extensive literature
Conservation education program		Pomerantz 1982; Harris and Gallagher 1989; Caza 1993
Mechanism to enforce regulations		
Management Evaluation across large spatial and temporal scales		Basic management
Monitored management plan		Goodier and Jeffers 1981; Goulet 1990
Ecological monitoring program		Ruzicka and Miklos 1990
Socio-economic monitoring program (support level, local benefits)		Thomas and Salwasser 1980; Ugalde 1989
Ongoing training		Lusigi 1988
Advisory Committee (external evaluation)		Eagles 1984
Annual report		Basic management

APPLICATION OF THE CONCEPTUAL FRAMEWORK

I used deductive content analysis to make systematic and objective comparisons of exploratory case study findings with academic literature on protected area management (Carney 1972). This application of content analysis is based on pattern-matching logic. As stated by Yin (1988:109) such logic "compares an empirically based pattern with a predicted one." Here the predicted pattern is a landscape management approach. I applied the framework to develop management approach profiles depicting a general overview of actions and their relative importance to achieving site specific objectives for each study site. Pattern matching allowed me to determine if examples of excellence provide any new insights into successful protected area stewardship. This comparative analysis of literature functions as one line of inquiry in a comprehensive study addressing successful management approaches for small protected areas.

CONCLUSION

To summarize, landscape fragmentation is the physical manifestation of the widespread disharmony between people and the land. The many small protected areas in Canada indicate the high degree of land disturbance (Wiken and Lawton 1995). Small protected areas are essentially landscape remnants. As such, they are seriously threatened by both natural and unnatural disturbances such as successional changes, high fire fuel loads and urban encroachment. The serious nature of threats to ecological fragments makes it crucial to understand effective management strategies, if small protected areas are to remain ecologically viable in the long-term, thereby maximizing their contribution toward maintaining and restoring healthy landscapes.

The goal of this paper was to address this need by reviewing the current thinking in conservation-related literature as it pertains to the challenge of effective management of protected areas and ecosystem fragments, in general. As was discussed, the land management approach currently advocated is a holistic approach that integrates protected areas into local communities and surrounding landscape. Based on this information, I then developed a conceptual framework that operationally defines the current land management paradigm.

Given the complexity and evolving nature of this paradigm, construct validity is no doubt limited, however, I believe the framework is adequate as a tool for deductive content analysis, that is comparison of current thinking in protected areas management with exploratory research in small protected area management. The framework also has useful practical applications as a management audit, as was noted by several managers involved in this study.

LITERATURE CITED

- Agee, J.K. and D.R. Johnson (eds). 1988. Ecosystem Management for Parks and Wilderness. University of Washington Press, Seattle, Washington.
- Andren, H. and P. Anglestam. 1988. Elevated predation rates as an edge effect in habitat islands: experimental evidence. *Ecology* 69:544-547.
- Brown, L. P. 1993. Holistic stewardship of prairie fragments. Pp. 165-169 in G.L. Holroyd, H.L. Dickson, M. Regnier and H. C. Smith, eds., Natural History Occasional Paper No. 19 - Proceedings of the Third Prairie Conservation and Endangered Species Workshop, Provincial Museum of Alberta, Alberta.
- Brown, L. P. 1994. Attributes of excellence in small protected area management -- preliminary findings. *Natural Areas Journal* 14(1):62-63.
- Brown, L.P., A.A. Einsiedel, and J.R. Butler. 1992. Some training priorities: A survey of American and Canadian Protected Areas Managers. Paper presented at the IVth World Congress on National Parks and Protected Areas, Caracas, Venezuela, February 10-21, 1992.
- Canadian Environmental Advisory Council. 1991. A Protected Areas Vision for Canada. Minister of Supply and Services Canada, Ottawa.
- Carney, T.F. 1972. Content Analysis: A Technique for Systematic Inference from Communications. University of Manitoba Press, Winnipeg, Manitoba.
- Catton, W.R. Jr., 1970. The wildland recreation boom and sociology. Pp. 105-123 in T.B. Johannis Jr. and C.N. Bull eds., *Sociology of Leisure*, Sage Publications, Beverly Hills, California.
- Caza, C. 1993. Building the future landscape. Pp. 3-10 in Marczk and D.B. Johnson. *Sustainable Landscapes*. Polyscience Publications Inc., Morin Heights, Canada.
- Cole, L. 1983. Urban nature conservation. Pp. 267-268 in A. Warren and F.B. Goldsmith, eds., *Conservation In Perspective*. John Wiley & Sons, Chichester, UK.
- Crow T. R. 1991. Landscape ecology: the big picture approach to resource management. Pp. 55-65 in D.J. Decker, M.E. Krasny, G.R. Goff, C.R. Smith, and D.W. Gross, eds., *Challenges in the Conservation of Biological Resources: A Practitioner's Guide*. WestView Press, Boulder, Colorado.
- Devall B. and G. Sessions. 1985. *Deep Ecology: Living as if Nature Mattered*. Gibbs M. Smith, Publisher Inc., Layton, Utah.
- Diamond, J.M. 1975. The island dilemma: lessons of modern biogeographic studies for the design of natural reserves. *Biological Conservation* 7:129-146.
- di Castri, F. and J. Robertson. 1982. The biosphere reserve concept: 10 years after. *Parks* 6(4):1-6.

- Dillman, D.A. 1978. Mail and Telephone Surveys: The Total Design Method. John Wiley & Sons, New York.
- Dyer, M. I. and H. M. Holland. 1991. The biosphere-reserve concept: Need for a network design. *BioScience* Vol. 41 No. 5 319-325.
- Eagles, P.F.J. 1984. The Planning and Management of Environmentally Sensitive Areas. Longman, London.
- Einsiedel, A. A., Jr. and L.P. Brown. 1992. Is scientific expertise enough to be effective in parks management? Pp. 223-228 in J.H. Willison, S. Bondrup-Nielsen, C. Drysdale, T.B. Herman, N.W. Munro and T.L. Pollock, eds., Science and the Management of Protected Areas. Proceedings of an international conference held at Acadia University, Nova Scotia, Canada, May 1991.
- Epp, H.T. 1991. Ecological process management for maintaining biological diversity on the Canadian prairies. Pp. 72-77 in G.L. Holroyd, G. Burns, and H. C. Smith, eds., Natural History Occasional Paper No. 15 - Proceedings of the Second Endangered Species and Prairie Conservation Workshop, Provincial Museum of Alberta, Edmonton, Alberta.
- Forman, R.T.T. and M. Godron 1986. Landscape Ecology. John Wiley and Sons, New York.
- Godron, M. and R.T.T. Forman. 1983. Landscape modification and changing ecological characteristics. Pp. 12-28 in H. Mooney and M. Godron eds., Disturbance and Ecosystems (Ecological studies; v. 44), Springer-Verlag Berlin.
- Goldsmith, E. 1993. The Way: An Ecological Worldview. Shamhala, Boston, Massachusetts.
- Goodier, R. and, J.N.R. Jeffers. 1981. Biosphere reserves. *Advances in Applied Biology* 6:279-317.
- Goulet, L.A. 1990. Planning for reserve integrity: the way it is. Presented at the CCEA meeting, Ottawa, Sept. 27-30, 1990.
- Grumbine, R.E. 1994. What is ecosystem management? *Conservation Biology* 8(1):22-38.
- Harris, L.D. 1984. The Fragmented Forest: Island Biogeography Theory and the Preservation of Biotic Diversity. The University of Chicago Press, Chicago, Illinois.
- Harris, L.D. 1988. Edge effects and conservation of biotic diversity. *Conservation Biology* 2:330-332.
- Harris, L. and J. Eisenberg. 1989. Enhanced linkages: necessary steps for success in conservation of faunal diversity. Pp. 166-181 in D. Western and M.C. Pearl, eds., Conservation for the Twenty-first Century, Oxford University Press, Toronto.

- Harris, L.D. and P.B. Gallagher. 1989. New initiatives for wildlife conservation: the need for movement corridors. Pp. 11- 34, *in* Preserving Communities and Corridors. Defenders of Wildlife, Washington, DC.
- Harris, L.D. and J. Scheck. 1991. From implications to applications: the dispersal corridor principle applied to conservation of biological diversity. Pp. 189-220 *in* D.A. Saunders and R.J. Hobbs eds., Nature Conservation: The Role of Corridors. Surrey Beatty and Sons, Chipping Norton, Australia.
- Hickman, S. 1990. Evidence for edge species attraction to nature trails within deciduous forest. *Natural Areas Journal* 10 (1):3-5.
- Hilts, Stewart. 1989. Private stewardship Pp. 99-106 *in* M. Hummel ed., Endangered Spaces: The Future for Canada's Wilderness. Key Porter Books, Ltd., Toronto, Ontario.
- International Union for Conservation of Nature and Natural Resources. 1980. World Conservation Strategy. IUCN, Gland, Switzerland.
- International Union for Conservation of Nature and Natural Resources. 1985. United Nations List of National Parks and Protected Areas. IUCN, Gland, Switzerland and Cambridge, U.K.
- International Union for Conservation of Nature and Natural Resources. 1990. 1990 United Nations List of National Parks and Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK.
- Janzen D.H. 1983. No park is an island: increase in interference from outside as park size decreases. *Oikos* 41:402-410.
- Janzen, D. H. 1986. The eternal external threat. Pp. 286-303 *in* M.E. Soulé, ed., Habitat fragmentation in the temperate zone. Conservation Biology: The Science of Scarcity and Diversity. Sinauer Associates, Inc., Sunderland, Massachusetts.
- Johnson, W.C. and N.R. French. 1981. Soviet Union. Pp. 343-383 *in* E.J. Kormondy, and J.F. McCormick, eds., Handbook of Contemporary Developments in World Ecology. Greenwood Press, Westport, Connecticut.
- Johnson D.R. and J.K. Agee. 1988. Introduction to ecosystem management. Pp. 3-14 *in* J.K. Agee and D.R. Johnson, eds., Ecosystem Management for Parks and Wilderness. University of Washington Press, Seattle, Washington.
- Karr, J.R. 1992. Ecological integrity: protecting earth's life support systems. Pp. 223-238 *in* R. Costanza, B.G. Norton, and B.D. Haskell, eds., Ecosystem Health: New Goals for Environmental Management. Island Press, Covelo, California.
- Krippendorff, K. 1980. Content Analysis: An Introduction to its Methodology. Sage Publications, Beverly Hills, California.
- Laurance, W.F. and E. Yensen. 1991. Predicted the impacts of edge effects in fragmented habitats. *Biological Conservation* 55:77-92.

- Levenson, J.B. 1981. Woodlots as biogeographic islands in southeastern Wisconsin. Pp. 13-39 in R.L. Burgess and D.M. Sharpe, eds., *Forest Island Dynamics in Man-Dominated Landscapes*. Springer-Verlag, New York.
- Levin, D.A., and H.W. Kerster. 1974. Gene flow in seed plants. *Evolutionary Biology* 7:139-220.
- Lovejoy, T.E., R.O. Bierregaard, A.B. Rylands, J. R. Malcolm, C.E. Quintela, L.H. Harper, K.S. Brown, Jr., A.H. Powell, G.V.N. Powell, H.O.R. Schubart, and M.B. Hays. 1986. Edge and other effects of isolation on Amazon fragments. Pp. 251-285 in M. Soulé ed, *Conservation Biology: The Science of Scarcity and Diversity*. Sinauer, Sunderland Massachusetts.
- Lusigi, W.J. 1988. The new resources manager. Pp. 42-51 in Vance Martin ed., *For the Conservation of Earth*. International Wilderness Leadership Foundation, Fulcrum Inc., Golden, Colorado.
- MacClintock L, R.F. Whitcomb, and B.L. Whitcomb. 1977. Evidence for the value of corridors and minimization of isolation in preservation of biotic diversity. *American Birds*. 31:6-16.
- MacKinnon, J. and K. MacKinnon. 1986. Review of the Protected Areas System in the Indo-Malayan Realm. Prepared for the International Union for Conservation of Nature and Natural Resources - Commission on National Parks and Protected Areas in collaboration with the United Nations Environment Programme.
- MacKinnon, J., K. MacKinnon, G. Child, and J. Thorsell. 1986. *Managing Protected Areas in the Tropics*. IUCN, Gland, Switzerland.
- McLellan, C.H., A.P. Dobson, D.S. Wilcove, and J.M. Lynch. 1986. Effects of forest fragmentation on new and old world bird communities: empirical observations and theoretical implications. Pp. 305-313 in J. Verner, M. Morrison, and C. Ralph, eds., *Wildlife 2000: Modeling Habitat Relationships of Terrestrial Vertebrates*. University of Wisconsin Press, Madison, Wisconsin.
- McNeely, J.A. 1989. Protected areas and human ecology: how national parks can contribute for sustaining societies of the twenty-first century. Pp. 150-157 in D. Western and M.C. Pearl, eds., *Conservation for the Twenty-first Century*. Oxford University Press, Toronto, Ontario.
- McNeely, J.A. and J. Thorsell. 1991. Guidelines for preparing protected area system plans. *Parks* 2(2):4-8.
- Machlis G.E. and D.L. Tichnell. 1985. *The State of the World's Parks: An International Assessment for Resource Management, Policy, and Research*. Westview Press, Boulder Colorado.
- Machlis, G.E., D.R. Field, and F.L. Campbell. 1981. The human ecology of parks. *Leisure Sciences* 4(3):195-212.
- Mader, H.J. 1984. Animal habitat isolation by roads and agricultural fields. *Biological Conservation* 29:81-96.

- Margules, C., and M.B. Usher. 1981. Criteria used in assessing wildlife conservation potential: A review. *Biological Conservation* 21:79-109.
- Maser, C. 1990. *The Redesigned Forest*. Stoddart Publishing Co. Limited, Toronto, Ontario.
- Nelson, J.G. 1991. Research in human ecology and planning. *Canadian Geographic* 35 (2):114-127.
- Newmark, W.D. 1985. Legal and biotic boundaries of western North American national parks: a problem of congruence. *Biological Conservation*. 33:197-208.
- Newmark, W.D. 1987. A land-bridge island perspective on mammalian extinctions in western North American parks. *Nature* 325:430-432.
- Noss, R.F. 1983. A regional landscape approach to maintain diversity. *BioScience* 33:700-706.
- Noss, R.F. 1987a. Protecting natural areas in fragmented landscapes. *Natural Areas Journal* 7(1):2-13.
- Noss, R.F. 1987b. Corridors in real landscapes: a reply to Simberloff and Cox. *Conservation Biology* 1:159-164.
- Noss, R.F. and L.D. Harris. 1986. Nodes, networks, and MUMs: preserving diversity at all scales. *Environmental Management* 10:299-309.
- Odum, E.P. 1986. Introductory review: perspective of ecosystem theory and application. Pp. 1-11 in N Polunin ed., *Ecosystem Theory and Application*, John Wiley and Sons Ltd.
- Orr, D. 1992. *Ecological Literacy*. SUNY Press, Albany, New York.
- Pickett, S.T.A. and J.N. Thompson. 1978. Patch dynamics and the design of nature reserves. *Biological Conservation* 13:27-37.
- Polunin, Nicholas and H. K. Eidsvik. 1979. Ecological principles for the establishment and management of national parks and equivalent reserves. *Environmental Conservation* 6(1):21-26.
- Pomerantz, G. A. 1987. Children and wildlife: research implications for recreation research management Pp. 192-206 in Marty L. and P. Brown, eds., *Recreation and Park Management*. Oregon State University, Oregon.
- Rapport, D.J. 1989. What constitutes ecosystem health? Perspectives in biology and medicine. 33:120-132.
- Reville, B.J., J.D. Tranter and, M.D. Yorkston. 1990. Impact of forest clearing on the endangered seabird *Sula abbotti*. *Biological Conservation* 51:23-38.

- Robbins, C.S. 1991. Managing suburban forest fragments forest fragments for birds. Pp. 253-264. *in* D.J. Decker, M.E. Krasny, G.R. Goff, C.R. Smith, and D.W. Gross, eds., *Challenges in the Conservation of Biological Resources: A Practitioner's Guide*. WestView Press, Boulder, Colorado.
- Rowe, J. S. 1990. *Home Place: Essays on Ecology*. NeWest Publishers Limited, Edmonton, Alberta.
- Ruzicka, M. and L. Miklos. 1989. Premises and methods in planning. Pp. 234-259 *in* I.S. Zonneveld and R.T. Forman, eds., *Changing Landscapes: An Ecological Perspective*. Springer-Verlag, New York.
- Salwasser, H., C. Schonewald-Cox, and R. Baker. 1987. The role of interagency cooperation in managing for viable populations. Pp. 159-173 *in* M Soulé ed., *Viable Populations for Conservation*. Cambridge University Press, Cambridge.
- Sargent, F.O., and J.H. Brande. 1976. Classifying and evaluating unique natural areas for planning purposes. *Journal of Soil and Water Conservation* 31:113-116.
- Saunders D.A., R.J. Hobbs and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: a review. *Conservation Biology* 5(1):18-34.
- Savory, A. 1991. Holistic resource management: a conceptual framework for ecologically sound economic modeling. *Ecological Economics* 3:181-191.
- Schonewald-Cox, C.M., and J.W. Bayless. 1986. The boundary model: a geographical analysis of design and conservation of nature reserves. *Biological Conservation* 38:305-322.
- Schroeder, R.L., and M.E. Keller. 1990. Setting objectives -- a prerequisite of ecosystem management. Pp. 1-10 *in* R.S. Mitchell, C.J. Sheviak, and D.J. Leopold, eds., *Ecosystem Management: Rare species and Significant Habitats*. Proceedings of the 15th Annual Natural Areas Conference, Bulletin No. 471, New York State Museum, The University of the State of New York, Albany, New York.
- Sessions, G. 1983. Ecophilosophy, utopias, and education. *The Journal of Environmental Education* 15(1): 27-42.
- Shafer, Craig L. 1990. *Nature Reserves: Island Theory and Conservation Practice*. Smithsonian Institution Press. Washington, D.C.
- Sheail, J. 1976. The acquisition and management of nature reserves. *in* *Nature in Trust: The History of Nature Conservation in Britain*. Blackie and Sons Ltd. London.
- Simberloff, D. and J. Cox. 1987. Consequences and costs of conservation corridors. *Conservation Biology* 1:63-71.
- Simberloff, D. and Nicholas G. 1984. Effects of insularization on plant species richness in the prairie-forest ecotone. *Biological Conservation*. 29:27-46

- Smith, P.G.R., and J.B. Theberge. 1986. A review of criteria used to evaluate natural areas. *Environmental Management* 10(6): 715-734.
- Smith, P.G.R., and J.B. Theberge. 1987. Evaluating natural areas using multiple criteria: Theory and practice. *Environmental Management*. 11(4): 447-460.
- Snyder, G. 1990 *The Practice of the Wild*. North Point Press.
- Soulé, M.E., and D. Simberloff. 1986. What do genetics and ecology tell us about the design of nature reserves? *Biological Conservation* 35:19-40.
- Suckling, G. 1982. Value of reserved habitat for mammal conservation in plantations. *Australian Forestry* 45 (1): 19-27.
- Temple, S.A. and J.R. Carey. 1988. Modeling dynamics of habitat-interior bird populations in fragmented landscapes. *Conservation Biology* 2(4):340-347.
- Theberge, J. B. 1989. Guidelines to drawing ecologically sound boundaries for national parks and nature reserves. *Environmental Management* 13(6):695-702.
- Thomas J.W., and H. Salwasser. 1989. Bringing conservation biology into a position of influence in natural resource management. *Conservation Biology*. 3(2):123-127.
- Turner M.G. 1989. Landscape ecology: the effect of pattern on process. *Annual Review of Ecology and Systemics*. 20:171-197.
- Turner, M.G. and R.H. Gardner (eds). 1991. *Quantitative Methods in Landscape Ecology: The Analysis and Interpretation of Landscape Heterogeneity*. Springer-Verlag, New York.
- Ugalde, A.F. 1989. An optimal parks system. Pp. 145-149 in D. Western and M.C. Pearl, eds., *Conservation for the Twenty-first Century*. Oxford University Press, New York, New York.
- UNESCO. 1984. Action plan for biosphere reserves. *Nature and Resources*. Vol. XX No. 4 Oct.- Dec.
- UNESCO. 1988. Safeguarding our yestermorrows. *Biosphere Reserve and the World Heritage Convention*.
- Wales, B.A. 1972. Vegetation analysis of north and south edges in a mature oak-hickory forest. *Ecological Monographs* 42:451-471.
- Wiken, E.B. and K. Lawton. 1995. North American protected areas: an ecological approach to reporting and analysis. *The George Wright FORUM* 12(1): 25-34.
- Wilcove, D.S., C.H. McLellan and A.P. Dobson. 1986. Pp. 237-256 in M.E. Soulé, ed., *Habitat fragmentation in the temperate zone*. *Conservation Biology: The Science of Scarcity and Diversity*. Sinauer Associates, Inc., Sunderland, Mass.

- Wilcox, B.A. 1980. Insular ecology and conservation. Pp. 95-117 in M.E. Soulé and B.A. Wilcox, eds., *Conservation Biology: An Evolutionary-Ecological Perspective*. Sinauer Associates, Inc., Sunderland, Massachusetts.
- Wilcox, B.A., and D.D. Murphy. 1985. Conservation strategy: the effects of fragmentation on extinction. *American Naturalist*. 125:879-887.
- Wright, R.G., and G.E. Machlis. 1984. Models for park management: a prospectus. Co-operative Parks Studies Unit Report CPSU/UI SB85-1. University of Idaho, Moscow, Idaho.
- Yahner, R.H. 1988. Changes in wildlife communities near edges. *Conservation Biology* 2:333-339.
- Yin, R. K. 1988. *Case Study Research: Design and Methods*. Sage Publications. Newbury Park, California.
- Zonneveld, I.S. and R.T. Forman (eds). 1990. *Changing Landscapes: An Ecological Perspective*. Springer-Verlag. New York.

CHAPTER 3

ATTRIBUTES OF EXCELLENCE IN SMALL PROTECTED AREA MANAGEMENT

INTRODUCTION

Small protected areas -- lands officially reserved for the protection of nature that are less than 1,000 hectares in size -- represent a tremendous diversity of conservation lands, ranging from private preserves to federal wildlife sanctuaries. Conservation philosophies, management resources, ecosystems protected, and the local conditions of small protected areas are likely to be as diverse as small protected area types. Consequently, each small protected area will have unique management challenges and solutions. A common factor among all small protected areas; however, is the ecologically minuscule area encompassed by their legally defined boundaries. Essentially, all small protected areas are ecological fragments.

Why focus on small protected areas? First, research in protected areas management tends to focus on large protected areas, such as national parks. Yet, over 80% of conservation lands in Canada's protected area system are less than 1,000 hectares (Rubec et al. 1990; Wiken and Lawton 1995). This figure does not include the 9,500 non-government North American protected areas, many of which are small as well (Wiken and Lawton 1995). Moreover, as landscape fragmentation continues, options to secure expansive tracts of conservation lands will be precluded. We can therefore, expect to see an increase in the ratio of small to large protected areas. The fragmented condition of the landscape of the United States suggests that, as in Canada, many American conservationists face the challenge of maintaining the ecological integrity of landscape fragments.

The ecological and social consequences of landscape fragmentation have been extensively discussed in conservation-related literature (both Shafer 1990 and Saunders et al. 1991 provide comprehensive reviews of the impacts of fragmentation). Briefly summarized, the smaller and more isolated a natural area becomes, the greater its vulnerability to both natural and unnatural disturbances (Odum 1986; Noss 1987). In addition, disruption of ecological processes, such as species migration, increases with degree of fragmentation (Janzen 1986;

Harris and Gallagher 1989). Consequently, the challenge of maintaining ecological viability is magnified for stewards of small protected areas.

Given the abundance of small protected areas and the challenge of effective stewardship of ecological fragments, it is evident that a significant amount of time and money is being devoted to these ecologically sensitive lands. This effort stresses the need to understand the most effective stewardship approaches for small protected areas if we are to maximize their contribution to conservation goals. The challenge now is to integrate new and existing knowledge into practical conservation strategies designed to meet this need.

The goal of this study is to learn from practitioners how to manage these fragile ecosystem fragments. This paper is based on analysis of a diverse set of small protected areas that were nominated as examples of excellence in conservation management by protected area managers and other professionals in conservation-related fields. Specifically, I use a qualitative case study approach to identify characteristics associated with excellence in conservation management at 16 exemplary small protected areas. This broad-based analysis forms the foundation for further exploration into understanding successful management approaches for small protected areas.

METHODOLOGY

Case Study Selection Process

Survey respondents (451 managers of public and private protected areas from across Canada and the United States) were asked to recommend a small protected area which demonstrated excellence in conservation management where "management" is defined as action toward desired end results. Survey respondents were asked to recommend a small protected area that demonstrated excellence in conservation management, where "management" was defined as action toward desired results. To obtain peer consensus, the list of nominated sites was reviewed by 60 other protected area managers and professionals in conservation-related fields. Sites nominated more than three times were given the highest priority for case study analysis. Along with peer consensus, logistics played a role in choosing study sites. In order to maximize travel funds, I selected sites that had been nominated more than once and that were geographically clustered or *en route* to high priority sites. This second factor explains the large number of study sites along the West Coast and the cluster of sites in Arizona.

Final verification of a protected area's status as a example of excellence in conservation management was determined by the manager's self-appraisal, external sources of recognition, and my on-site evaluation. Three sites were eliminated at this stage of the selection process. Although, I studied a total of 33 nominated examples of excellence, in this paper I include only the 16 case studies for which I was able to obtain complete data sets.

Despite this rigorous selection process, I recognize that many examples of excellence will be missed and that, "excellence in conservation management" remains a subjective concept with numerous interpretations. By using a diverse jury and by studying only sites with multiple nominations, I endeavored to ensure that the 16 sites studied are valid examples of successful small protected area management programs. Results of the case study selection process are provided in Table 3.1. and site locations are shown in Figure 3.1.

Table 3.1 Results of the case study selection process.

Name of Site	Location	Nominations
1. Living Prairie Museum	Manitoba	6
2. Point Lobos State Reserve	California	5
3. Mary's Point (section of the Shepody National Wildlife Area)	New Brunswick	4
4. Ramsey Canyon Preserve	Arizona	3
5. Hassayampa River Preserve	Arizona	2
6. Patagonia-Sonoita Creek Preserve	Arizona	2
7. Coyote Lake Nature Sanctuary	Alberta	2
8. Minnekhada Regional Park	British Columbia	2
9. Cascade Head Natural Area	Oregon	2
10. Fairfield Osborn Preserve	California	2
11. Anderson Marsh Historic State Park	California	2
12. Protection Island National Wildlife Refuge	Washington	2
13. Bodega Marine Reserve	California	2
14. Padilla Bay National Research Reserve	Washington	2
15. James V. Fitzgerald Marine Reserve	California	2
16. Grizzly Creek Redwoods State Park	California	2



Figure 3.1 Location of study sites (numbers correspond to site numbers in Table 3.1).

Categorized according to management authority, the distribution of protected area types is as follows: five non-government organization; three municipal/regional government; three provincial/state government; two federal government; one joint federal and state government; one private citizen; and one university.

Case Study Protocol

I primarily followed case study design recommendations in Yin (1988). Other useful references include House (1980); Fowler (1988); Rubin (1983); Grosf and Sardy (1985) and Burgess (1988). I gained additional information on case study research by reading

case studies from scientific (Whyte 1955; Riley 1963; Towl 1969; Stake et al. 1978; Brodtrick 1988; Tanner 1990) and non-scientific (Peters and Waterman 1982) literature.

One of the major strengths of the case study approach, according to Yin (1988), is that construct validity is increased through corroboration of both qualitative and quantitative data from multiple sources. In this study, data sources for each case study include a written survey -- developed according to Dillman's total design method (1978); a semi-structured interview; an on-site evaluation; and a variety of management-related documents (interpretive brochures, management plans, related publications, annual reports, etc.).

Overview of Analytical Techniques

To develop an understanding of characteristics associated with excellence in conservation management of small protected areas, I used a combination of analytical techniques: (1) descriptive statistical analysis; (2) inductive thematic content analysis; and (3) deductive thematic content analysis. Descriptive statistics provided background information useful in interpreting findings of content analysis. Content analysis involves "objectively and systematically picking out characteristics" of any kind of communications (Carney 1972). It can be used both qualitatively or quantitatively. Here emphasis is placed on qualitative application, to Preserve the context of the data and to provide rich, in-depth insights into exemplary management practices. The analysis is based on methodologies described in Glaser and Strauss (1967), Carney (1972), Strauss (1987), and Bogden and Bicklen (1992). With thematic content analysis, the unit of analysis is the theme (subject matter of a sentence, or group of sentences), and its associated properties.

Inductive content analysis facilitates discovery of possible new insights into successful protected area management. In contrast, deductive content analysis allows systematic and objective comparison of management approaches at nominated examples of excellence with extant literature in protected areas management. The comparative framework used in deductive content analysis was based on an International Union for the Conservation of Nature and Natural Resources (IUCN), or World Conservation Union, management effectiveness checklist produced by an international group of experts in protected areas management (MacKinnon et al. 1986). Inductive and deductive content analysis are complementary analytical tools useful in identifying characteristics associated with successful management approaches. The findings of both techniques are combined in the

discussion on "attributes of excellence," and are used to supplement the discussion on site-related characteristics.

RESULTS AND DISCUSSION

Site-related Characteristics

Table 3.2 presents an overview of site-related characteristics. This overview fulfills two functions. First, it provides background information useful to subsequent thematic content analysis. Second, the site-related characteristics, summarized in descending order of excellence, facilitate analysis of trends and possible explanatory variables associated with excellence in conservation management of small protected areas. For example: "Do examples of excellence tend to be close or far from population centers?"; "What type of background and experience do managers of these examples of excellence have?"; and "Do these management paragons have high or low support levels?" Because I have so few case studies, non-parametric statistical analysis would have been unreliable. Instead, in this paper I highlight interesting findings and suggest areas for more in-depth analysis.

From Table 3.2, it was readily apparent that this group of nominated examples of excellence in small protected areas management, exhibit a tremendous diversity in site-related characteristics. These characteristics are discussed below.

Regional Context

In this study there was a marked difference in the regional context of each small protected area. As discussed below, each situation presents different opportunities and obstacles to effective protection. All sites are within 60 km of a population center (greater than 1,000 people), with three sites located within or directly adjacent to a town or city. The population density of surrounding areas, varied greatly and affected management's ability to meet site objectives. For example, at two sites, Mary's Point and Grizzly Creek State Park, managers noted that low population density made it difficult to recruit volunteers. In contrast, close proximity to human communities resulted in serious threats to ecological viability, including habitat isolation, marsh drainage, disruption of hydrological processes, residential development, invasion of exotic species, human over-use of buffer areas, and large influxes of visitors. Close proximity to population centers also created the need for ongoing, open communication with local people to keep

Table 3.2 Site Related Characteristics

Site	Regional Context			Years Established	Size and Connectedness			Visitation		Management Resources		Manager		
	km from City	Regional population density	Support level		Size (ha)	Expected Size Change (%)	Buffer (%)	Annual Visitation x1000	Limit on Visitor Numbers?	Budget x1000	Paid to Volunteer Staff Ratio	Years at site	Total Years Experience	Educational Background
1	0	High	High	24	16	0	0	15	No	105	5/8	7	7	Agriculture
2	13	Mod	High	62	500	+104	80	320	Yes	29+	8/110	14	22	Wildlife Biology
3	50	Low	High	17	188	0	75	15	No	20	4/2	20	32	Medicine, Natural History
4	10	Mod	High	21	120	0	75	30	Yes	260	8/25	6	22	Ecology
5	5	High	High	8	136	+30	0	10	No	125	5/70	4	32	Etymology, Botany
6	32	Low	High	29	140	+86	25	30	No	75	6/25	6	15	English Literature
7	60	Low	Mod	23	128	+100	50	0.35	No	<1	0/2	22	22	Education, Coop Development
8	10	High	High	18	175	+17	90	100	No	156	2/0	10	17	?
9	16	Low	High	29	120	0	85	10	No	15	3/15	5	9	Biology
10	10	Mod	Mod	24	84	+143	75	8	No	36	1/35	7	7	Environmental Education
11	1	Mod	High	13	354	+27	25	30	No	120	3/30	10	22	Wildlife Biology
12	10	Mod	High	7	130	0	75	0.2	Yes	150	4/50	3	15	Wildlife Biology, Recreation
13	16	High	High	29	145	0	90	1	Yes	60	2/20	8	8	Ecology
14	14	Mod	High	15	1000	+400	25	30	No	300	13/5	11	15	Natural Resources
15	0	High	High	26	152	+39	0	115	No	148	4/60	23	26	Biology, Education
16	30	Low	Low	46	94 & 66	0	0	25	No	75+	6/1	14	20	Biology, Business Administration

them informed about protected area happenings (e.g. up-coming prescribed burns), as well as creating the need to "stay tuned" to local concerns (e.g. local residents annoyed with overflow visitor parking).

A re-occurring theme in protected area management literature is the importance of support for conservation objectives (Thomas and Salwasser 1989; Ugalde 1989; McNeely 1989). To measure support level, I used a five point Likert scale (no support to very high support). Managers were asked to rank level of support for protection for each of 12 possible groups (three levels of government, non-government organizations, agriculture, industry, local community, chamber of commerce, surrounding landowners, cultural groups, educational institutes and scientists). Maximum support score varied for each site. For example, if federal government support was not perceived to be relevant to a particular site, the maximum support score decreased by five points. Based on preliminary research, I assumed support scores would follow a normal distribution curve. Low, moderate and high support scores are based on 33.3 percentiles. Using this very general support measurement scale, I found that over 80% of the sites studied had a high support level.

In a somewhat contrasting situation, local support was not used to its full advantage. In this situation, a non-government organization made a private land transaction involving an area that held traditional and special meaning for local residents. The manager noted that increased communication with community members regarding implications of the ownership change on traditional uses (even though not required in a private land transaction), would have strengthened public relations during the establishment phase, making subsequent protection easier.

One of the sites studied had low support despite its nationally significant ecological values. In fact, support was so low that the site faces de-designation whenever upper management undergoes budgetary cuts. In addition to lack of organizational support, the protected area is an ecological island, surrounded by timber companies and a generally anti-conservation community. This small protected area is a striking contrast with other sites fortunate to have large ecological buffers, local conservation advocates, and strong support from upper management.

Without more exact information on pre-establishment support levels, along with trend data on how support level changes with management approach, I cannot comment on possible

relationships between support and management approach. I believe trend analysis studies, using more sophisticated measurements, would provide valuable information on how and why support changes with management approach.

Establishment History

The mean years established for the sites studied was 24, with the newest and oldest established sites, 7 and 62 years old respectively. Analysis of establishment history indicated that local support was a significant factor in the establishment of 69% of these exemplary small protected areas. Of these locally supported sites, 45% are conservation lands that were donated by private land owners.

Size and Connectedness

Size (Odum 1986; Noss 1987; Saunders 1991) and connectedness (Suckling 1982; Crow 1991) have been identified as key determinants of ecological viability. Accordingly, these characteristics were measured in this exploratory study of successful small protected area management. The small protected areas studied ranged in size from 16 to 1,000 hectares. Many sites are very small according to legal boundaries (mean size is 209 hectares); however, this is somewhat misleading because over 50% of the study sites have a large buffer surrounding more than 75% of the legislated boundary, thereby making their functional ecological size greater. In contrast, four places had absolutely no ecological buffer, and two of these have little chance of restoring connectedness because of their largely human-dominated surroundings.

One of the rewarding aspects of exploratory research is surprise findings. One such surprise finding is that all the nominated examples of excellence have increased in size since legally designated, and 56% are expected to increase again. The predicted size increase ranges from 17% to 400% (average 209%). At two sites, the buffer, rather than the actual Preserve is expected to expand, again increasing functional size of these ecological fragments. Size and buffer expansion can be considered as indicators of successful management approaches.

Visitation

One of the ongoing challenges in protected area management is trying to achieve the elusive balance between adequate protection and still allow public visitation. This goal is a challenge even at the largest parks in North America. Given the small size of sites studied, I therefore was surprised to find the annual visitation averaged 46,000 people per year and varied from 200 to 320,000 people. All sites were open to the public, except two where public visitation occurred by permission only. Three of the 16 study sites (both public and privately owned) have established, and strictly enforce, a fixed visitor carrying capacity (number of visitors allowed in for a given duration). Managers of four other places indicated the need to restrict visitor numbers because of existing or potential visitor-related damage. Visitor management will probably become an increasingly important area of research in small protected area management, providing information useful to protected area managers of both small and large protected areas.

Management Resources

Einsiedel and Brown (1992) found limited management resources to be a commonly reported threat to ecological viability of small protected areas. In this exploratory study; however, the high degree of variability in budget and staff (both in total number of people involved in management and the paid to volunteer staff ratio) suggests that high budget and a large staff are not essential to successful management of small protected areas.

Manager

Three managers commented on the importance of continuity in management staff because continuity contributed toward developing local perceptions of staff as community members rather than as outsiders, representing distant organizations or government bureaucracies. Of the managers interviewed, 44% had worked at the site more than half of the protected area's "lifetime." Although these findings are in no way conclusive, management continuity may be an important variable to consider in future studies, as a possible explanatory factor in successful management.

Over 75% of the managers had ten or more years experience in protected areas management or directly related fields. All managers had post-secondary education, many (56%) specializing in conservation-related fields such as zoology, wildlife management and environmental education, while others specialized in business administration, medicine and English literature.

Habitats Protected

The 16 case studies represent all major habitat types (classified according to Cooperider et al. 1986) with the exception of "tundra" (Figure 3.2). The high diversity of habitats protected by these small protected areas is evident by the fact that, combined, the 16 sites protect 43 major North American wildlife habitat types.

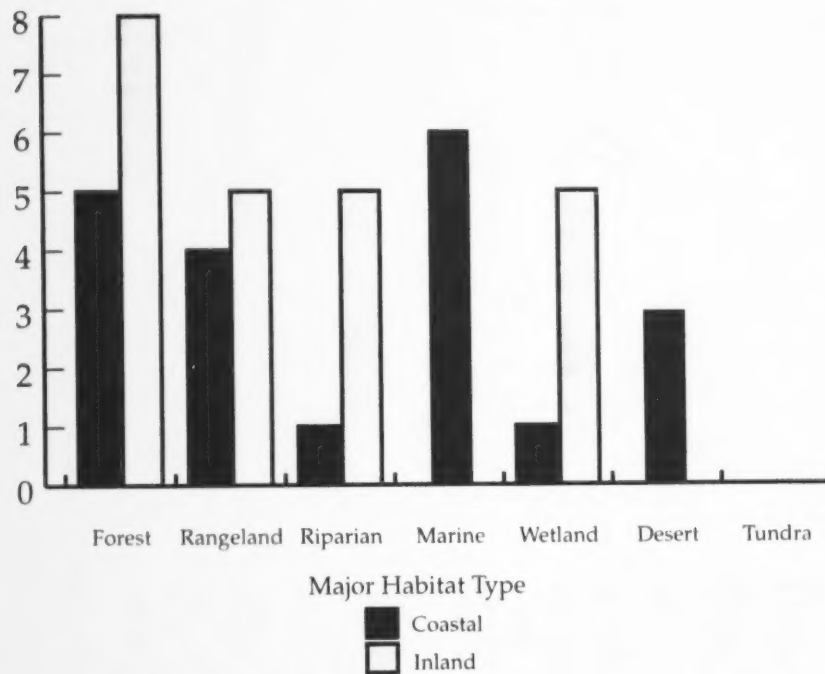


Figure 3.2 Major North American Habitats Represented by Study Sites.

Management Approach Characteristics

Despite the wide diversity in site-related characteristics, thematic content analysis revealed 11 management approach characteristics at the 16 study sites (Table 3.3). For each site, an attribute is categorized as one of the following: (1) evident as a management approach characteristic from discussion with the manager or

Table 3.3 Management approach characteristics at nominated models of excellence in small protected area management.

SITE	"ATTRIBUTES OF EXCELLENCE"										Strong Dedication of Stewards
	Clear Mandate	Large Scale Focus	Community Involvement	Advocacy Work	Research and Monitoring	Partnerships and Networks	Ecological Restoration	Minimize Visitor Impact	Maximize Visitor Experience	Innovative Management	
1. LPM	*	●	●	●	*	*	*	●	●	*	*
2. PLSR	*	●	*	●	*	●	*	*	*	●	*
3. MP	*	*	●	●	●	*	NA	*	*	●	*
4. RCP	*	*	●	*	●	*	*	*	●	●	●
5. HRP	●	●	*	*	●	●	●	●	●	●	*
6. P-SCP	*	●	*	*	*	*	●	●	●	●	●
7. CLNS	●	*	*	*	●	*	NA	●	●	●	●
8. MRP	●	●	*	*	●	*	●	●	●	●	●
9. CHNA	●	●	*	*	*	*	*	*	●	●	●
10. FOP	●	●	*	●	●	*	●	●	●	●	*
11. AMHSP	*	*	*	*	●	●	●	●	●	●	*
12. PINWR	●	○	●	*	●	●	●	*	○	○	●
13. BMR	●	●	NA	●	*	*	●	*	○	○	*
14. PENRR	*	●	*	●	*	●	●	●	●	●	*
15. JVRMR	●	○	●	●	●	●	●	*	●	○	*
16. GCSP	●	●	○	○	●	●	●	●	*	○	*
SUMMARY	100	88	88	94	100	100	88	100	88	75	100
% ●	44	25	56	50	38	56	25	44	19	6	63

Legend: ● Management characteristic discussed by manager or otherwise evident from case study analysis.
 * Management characteristic noted by manager as important to successful management at site.
 ○ Management characteristic not evident from case study analysis
 NA Management characteristic noted by manager to be inappropriate or not necessary

otherwise evident from case study analysis; (2) not evident from case study analysis; (3) noted by the manager to be inappropriate or not necessary at that particular site; (4) explicitly stated by the manager to be *important* or *critical* to successful management at that site. The characteristics were not weighted, with the exception of this latter categorization.

Clear Mandate

One attribute that was evident at all nominated examples of excellence studied was a strong sense of purpose or clear management mandate. During several interviews, the manager repeatedly referred to an organizational mission. At other sites, the mission statement was prominently displayed. Sometimes management was driven by a strong personal philosophy, rather than an organizational mission. For example, one man's fundamental belief in the inter-connectedness of all life, translated into a management approach aimed at developing stronger local awareness of the important connections between the protected area and nearby human communities. At the majority of sites (81%), the mandate was supported by a written management plan with specific objectives.

A common message from managers at these examples of excellence was that protection must come first: other objectives such as education and visitor services are important, but must be secondary to protection. For example, at the Ramsey Canyon Preserve (a popular Nature Conservancy Preserve in southwestern Arizona), the mission to protect rare species and their habitats is clearly stated and is never compromised:

[w]e answer to our members and we have a clearly stated mission that we are here to protect rare species and anything we can do along with that is fine, but anything that impacted the rare species, there is no question about whether we would do it or not. We wouldn't do it.

Similarly at the publicly owned, Point Lobos State Reserve, the protection mandate is not compromised. For example, there is a limitation placed on visitor numbers. Notably, this small protected area set a precedent in California's state conservation lands as the first state reserve with the mandate to protect the diversity of ecosystems, rather than to provide recreational opportunities or to Preserve historic values.

Regardless of whether ownership is private or public, having a clear protection mandate and adhering to it appears to be an important determinant of excellence in small protected area stewardship.

Large-scale Focus

Many managers (88%) believe that achieving protection of their small protected area requires long-term and large-spatial thinking. For instance the protection goal is not set according to one-year or even ten-year time spans, rather the goal is protection in perpetuity. Managers tended to focus on processes that sustained species, rather than focusing on species alone. This large-scale perspective required planning and management efforts beyond the Preserve boundaries. As one manager stated it, "our little 300 A Preserve is not secure. It is affected by a lot of outside influences. Community cooperation and protection outside the boundaries is needed to keep the system alive."

While management focus extends beyond the species level and correspondingly beyond the Preserve boundaries, most managers were still grappling with the complexity of landscape-level management. For example, developing *measurable* objectives at the ecosystem level was noted as a significant challenge by several managers because of limited understanding of ecological processes. Moreover, deductive content analysis indicated that 38% of the sites lacked regional system plans to document in writing management concerns and actions required pertaining to the larger region.

Related to large-scale thinking in time and space was "the need to take the conservation message outside the park." This aspect of successful small protected area management was closely linked to the following two "attributes of excellence": community involvement and advocacy work.

Community Involvement

Community involvement was a characteristic of the management strategies at 88% of the 16 nominated small protected areas, and at nine of the sites, this attribute was explicitly stated as being important to success. At most sites, community involvement meant providing opportunities for the community to participate in site management through public planning processes, volunteer work, advisory committees and fundraising.

At several sites, the stewards made a concerted effort to participate in the community by joining the Chamber of Commerce and other local organizations, sponsoring community events, and participating in activities not directly related to ecosystem protection, such as restoration of local historic sites. At these sites there was evidence of a mutually beneficial

relationship -- local community participation in site management, and in return, management contributing to the community.

An example of mutually beneficial two-way community involvement was demonstrated at Patagonia-Sonoita River Preserve -- an internationally renowned birding destination in Arizona. The nearby town of Patagonia, a community of 900 people, is very committed to the Preserve and they recognize it as the anchor of the community because of its economic and social benefits. However until the current manager, Jeffrey Cooper, brought with him a partnership, open-dialogue approach to land stewardship three years ago, many locals did not even know that for the past 27 years The Nature Conservancy owned and operated the Preserve. He stated that, "the Preserve and the community are vitally linked to one another, depend upon each other and therefore need to work closely with one another." In contrast, the past manager had a very isolating approach, and with that approach came little recognition of the Preserve's importance to the town and also a constant vandalism problem -- the Preserve was a party place for local youth. The new Preserve manager turned this problem into a positive opportunity by hiring local youth as part of a high school intern program. The program has been a tremendous hit with the community, because residents see it as an investment in their youth. The vandalism has stopped and some local youth now see the Preserve as a place of opportunity, rather than a place to party.

Advocacy Work

Community involvement was commonly used as an advocacy tool. Other mechanisms used to develop recognition and support for site protection and wildland conservation in general varied greatly. A few examples include writing newspaper articles, hiring local people, establishing a volunteer association, hosting Christmas bird counts, presenting briefs about the importance of nature conservation to county councils, involving the public in the establishment and planning processes and offering educational programs.

All the study sites had some form of conservation education, whether it was simply a sign, brochure, newsletter, or a more extensive interpretive program. At some sites, education is recognized as essential to far-reaching conservation goals, that is, nature preservation beyond the protected area boundaries. Doris Hopkins, private land donor and co-steward of the Coyote Lake Nature Sanctuary (now part of the larger Coyote Lake Conservation Area) commented, "we welcome visitors, especially young people, because people who

have exposure to nature, appreciate nature. People have to do more than learn about nature; they need to see nature as their home, to get to know it and feel at home in it."

At one small protected area established for research, the reserve manager believed it was not necessary to develop support for the protected area. At another study site, no specific actions were taken to develop support. Notably, this latter site also had a very low support level.

An important aspect of advocacy work, according to a few stewards I interviewed, was the need to send a clear and consistent message about the protected area's purpose: what the protected area is and is not. This comment marks a clear differentiation between advocacy-oriented communications and publicity-oriented communications. In fact, several managers commented that they avoided publicity about their small protected area to avoid increasing visitor numbers. Other managers stressed the importance of tight control over publicity, again to minimize visitor-related problems.

Research, Monitoring, and Evaluation

Research, monitoring, and evaluation were evident at all 16 examples of excellence. Six managers specifically stressed the need to have baseline data and continual monitoring of key species and ecological processes to be aware of ecological changes and to improve understanding of how management (passive or active) is affecting site conditions. For example at Cascade Head Natural Area, management is guided by research. Debbie Pickering, Preserve ecologist, stressed the need to know what you have and what is going on the Preserve *before* taking action. She remarked, "people may complain that we are slow to do things because we take a long-study approach, but we want to ensure we are not doing more damage than good."

In addition, follow-up research is needed to answer the question, "Are you meeting your objectives?" Cheryl Neilson of the Living Prairie Museum (a 16 hectare tall grass prairie Preserve in Winnipeg City) commented, "research analysis must be done in conjunction with management because it tells you what you truly have. This is really important. A big part of management has to be that it is monitored to make sure that we are meeting our objectives."

Dr. Connors, manager of Bodega Marine Reserve (part of the University of California Research Reserve system), suggested that, "photographic monitoring is a quick and easy way to get some sense of how things are changing and that photographic monitoring should be started immediately on whatever scale can be afforded."

Economic studies have proven to be very beneficial in developing successful management programs. Their usefulness was demonstrated at two Nature Conservancy Preserves where a regional economic study (Crandall et al. 1992) showed that nature tourism brought in over three million to the local region on an annual basis. Tangible evidence of the Preserve's contribution to the local economy has made a positive impact on local businesses, Chamber of Commerce, and other traditionally non-supportive groups.

Research and other management activities are often made possible through informal partnerships with educational institutions (high school and post-secondary), community group, and other conservation organizations.

Partnerships and Networks

A strong spirit of co-operation (with a diverse group of partners including other land management agencies, non-government conservation organizations, government bodies at local, national, and international levels, educational institutes, local community members and organizations, and others) was evident at all the examples of excellence studied, and at 56% of the sites the manager noted that partnerships and networking were important to successful management of that site. For instance, without co-operation at local, national, and international levels, migratory shorebird protection at Mary's Point -- one of several critical links in shorebird survival -- would be futile. As Dr. Morrison of the Canadian Wildlife Service stated it, "for conservation to be effective, it is essential that all the links in the chain be maintained, since removal of one risks destroying the entire system" (Morrison 1987). Thus for conservation of migratory species, co-operation is imperative.

It is largely through partnerships and co-operative efforts that the majority of small protected areas have expanded in size since establishment and are predicted to increase in size within the next ten years. In other instances, legal boundaries have remained the same, but ecological boundaries have increased because of co-operative stewardship agreements with surrounding landowners.

Different types of networks were used to achieve management objectives: (1) ecological networks -- a coalition of land stewards (private and public) working together for a common land stewardship goal, such as protection of a watershed; (2) knowledge networks -- an information-sharing network among local people, regional land managers and researchers to discuss common concerns and issues or to solve a specific problem; and (3) work networks -- a loose network of people, often volunteers, who get together to accomplish a specific job such as building a nature center or planting native species. Informality and on-going communication were characteristics shared by all three network types.

Ecosystem Restoration

Although managers I interviewed tended to express a "let nature be" philosophy, the managers believed that "letting nature be" and "doing nothing" were not synonymous and that "doing nothing" could, in fact, be detrimental to ecological protection. For example, Glen McGowan, manager of Point Lobos State Reserve, remarked that, "many locals have the idea that 'preservation' means 'do nothing.' Take fires, for example, to 'do nothing' would actually mean to let the fires burn. By preventing fires, we are tampering the natural processes."

Fifteen of the sixteen (93%) of the small protected area management programs involved some form of restoration work to re-create impaired ecological processes. Restoration ranged from keeping invasive exotic species under control to large-scale restoration projects such as prescribed burning or stream restoration.

The decision to implement restoration work, can be a difficult one. For example, Debbie Pickering remarked:

[w]e state that our objective is to maintain the area as an open grassland, whereas, if forest succession is the natural process, why don't we let it do that? Part of it has to do with the fact that a lot of coastal grassland has been destroyed by development. Normally if this area grew over, another area would have been developing as a grassland. But this is not happening anymore. And so we have an artificial situation where we have to manage to keep it an open grassland. It goes against the idea of "natural" but there are limited options left.

In addition, managers implementing restoration work sometimes had to deal with public backlash, especially pertaining to prescribed burns. Evidence that negative public opinion

about fires can be changed was seen at the Living Prairie Museum in Winnipeg City, where prescribed burns are regularly implemented on land adjacent to residential housing. In fact, the burn program is so well accepted, the manager now conducts controlled burns at other natural parklands in Winnipeg City.

At several sites, restoration projects are used as educational opportunities to increase public understanding of natural ecological processes and why restoration work is necessary.

Minimization of Visitor Impacts

Minimization of visitor impacts is another attribute associated with successful small protected area stewardship: all of the small protected area management programs analyzed implemented some form of visitor control, and 44% of the managers emphasized that visitor controls are important to successful management. At several sites of excellence -- both public and private -- visitor access is allowed only if the primary mandate of protection is not being impaired. Some of techniques used to control visitors at the examples of excellence I studied included: zoning; a trail permit system; limited parking; restricted access hours; trail rovers; educational regulation signs that provide information on how and why visitors should conduct themselves while visiting the site; an entrance gate; visitor reservation system; and having a resident manager.

The use of media was noted as a powerful visitor management tool, which if strictly controlled, can bring visitors with attitudes and expectations appropriate for a specific site. However, on occasions where media use was not strictly controlled, the consequences (rapid increases in visitation and misinformed visitor expectations) were very time consuming and frustrating.

While controlling visitor numbers and visitor behavior was important to the ecosystems under protection, many managers noted that controlling visitors was also a way to "protect" the visitor's experience. For example, Tom Wood of Ramsey Canyon Preserve commented, "we have about 30,000 visitors per year right now. If we just threw the gates open and put a sign on the highway, we would double that no problem at all. But in doubling that we would destroy what people are coming here for and what we are here for." Thus, minimizing visitor impacts can provide dual benefits of better ecosystem protection and better quality visits.

Maximization of Visitor Experiences

Although controlling visitors was recognized as necessary to immediate ecosystem protection, long-term protection was sought through facility design and management actions that maximized visitor experience. Maximizing visitor experience at the study sites meant helping people connect with nature, and helping people to get the most out of their visit; sometimes with the outcome of increasing support for the protected area and for conservation in general. A few examples of ways used to facilitate a meaningful visitor experience at the examples of excellence analyzed included having a marsh boardwalk; Preserve hosts who greet and inform visitors about current highlights happenings; wildlife sighting boards; roving volunteer naturalists; bird blinds and feeders; and guided hikes into restricted areas.

Many of the characteristics I have discussed, especially minimizing visitor impact and maximizing experience, could only be successfully implemented by people. Accordingly, one might wonder if large budgets and high staff numbers are explanatory factors pertaining to excellence in conservation management of small protected areas. However, as demonstrated in Table 3.2, there was high variability in management resources. Generally, budgets and human resources were limited. For example, deductive content analysis that indicated half of the sites lacked long-term financial security. The next attribute -- innovative management -- in conjunction with a spirit of co-operation, discussed previously, seemed to compensate for limited management resources at the sites studied.

Innovative Management

Limited management resources seemed to be an obstacle transformed into opportunities to reach out to the community-at-large. In doing so, people became involved in management. For example at Fairfield Osborn Preserve, the interpretive center was funded and built with the help of local community members. Through innovative stewardship that involves people in caring for a protected area, the site can gain recognition and support.

A few examples of innovative ways used to "get the job done" include wish lists asking people to donate anything from furniture to tractors to artistic talents; selling crafts made from exotic species (e.g. baskets made from tamarisk); transforming existing buildings into useful spaces (e.g. converting a farm shed into a trail side museum); and parking fines "paid" through community work at the protected area.

Strong Dedication of Stewards

One of the most outstanding attributes of excellence demonstrated in this exploratory study of successful small protected area management was the personalities of the stewards who cared for the land. There was a variety of personality traits that were discussed by managers in reference to the people responsible for site establishment, in reference to paid and volunteer staff, and in reference to themselves. These personality traits included being: credible to community members; determined; co-operative; politically astute; open-minded; good listeners; empathetic and respectful toward people; proud of their work; believers that they were making a difference to conservation goals; and compassionate about the land under their stewardship.

Many (69%) of the small protected areas I studied exist today because of the vision and determination of a single person or group of local citizens, rather than by some objective selection process. For example, Protection Island- National Wildlife Refuge (nesting site of 72% of the seabirds in Puget Sound) was saved from housing development because of sheer perseverance. A quote from Audubon magazine (Harwood 1983:88) states:

... as camps and trailers and cars appeared on Protection Island, a few Audubon Society members and other conservationists began to drum up support for halting the development. They were led -- perhaps *inspired* is a better word -- by Zella M. Schultz, artist, zoologist, and teacher, a woman of apolitical instincts and precarious health, who had been studying and banding the gulls of Puget sound for many years.

After Zella Schultz's death, "leadership of the 'Save Protection Island' passed to one of Schultz's close friends and birding companions, Eleanor Stopps, founder of Admiralty Audubon Society in Port Townsend." Stopps' dedication to save Protection Island from a massive retirement housing development led her to quit her job, move closer to the island and devote her full-time to saving Protection Island. On October 15, 1982, President Reagan signed the Protection Island National Wildlife Act, making Protection Island the first and only new wildlife refuge of the Reagan administration (Carson 1983).

Ongoing successful protection could be attributed to the managers who give 100% and more in their stewardship efforts. Several managers commented that caring for their protected area was much more than a job. Two quotes from Harry Thurston's book "Tidal Life: A Natural History of the Bay of Fundy" (Thurston 1990:58) illustrate Mary Majka's passion for her work as volunteer guardian of Mary's Point:

[i]t is more than a profession. It is a lifetime occupation. I feel almost like a nun.

[t]he Bay's comings and goings are something I treasure very much. I don't think there could be anything more rewarding than to live with the pulse of nature, in accordance with each heartbeat, so to speak.

Eric Hopkins of Coyote Lake Nature Sanctuary spoke of the land as a friend, "nobody who lives on the land and keeps their eyes open can go long before they see all the life around them. The land becomes a friend and you become very protective of the plants and animals that depend on that land" (Fleming 1995).

The managers' strong belief in the worthiness of their work was readily apparent from the interviews. Cheryl Neilson, for instance, asserted, "you have to really believe in it. I really enjoy what I do and I get a real thrill when I make a difference."

Managers took care to hire staff and recruit volunteers who also cared deeply for nature. For example, Val Little, manager of the Hassayampa River Preserve, discussed the importance of hiring the right people:

I think recruitment of paid and volunteer staff is critical. Hiring the right people can do a great deal toward acceptance within a community and acceptance by the visitors. I don't think people could articulate it, but a lot of people I think come here and the experience they have is greatly affected by the smiling face and the attention they get from the volunteer or staff person. I think people should be made to feel comfortable, particularly if they are not normal Preserve-goers where they might have some trepidation about what this place is and what do you do here. I think it is very important to have very responsive and people-oriented and non-threatening kinds of folk to give them that information, so that they are not trivialized or made to feel stupid or inadequate in any way.

At six (38%) of the small protected areas studied, volunteers were considered the lifeline of successful stewardship programs. Volunteers provided educational experiences for school children, raised funds, implemented research and restoration projects, acted as a local guardians, and performed numerous other management activities. A quote from The Nature Conservancy's Fairfield Osborn Preserve -- Environmental Education Volunteer Docent Training Manual verifies the importance of volunteers to successful land stewardship:

[t]he reason The Nature Conservancy accomplishes so much with its limited resources is because of its reliance on the assistance of many volunteers. Volunteers perform almost every function within the organization that keeps it going; from office work in

our San Francisco office, trail maintenance at Boggs Lake in Lake County, or leading educational hikes at Fairfield Osborn Preserve.

Although it was difficult to find one overall personality trait that captured all of the above characteristics listed and illustrated with anecdotal quotes, "strong dedication to conservation" seemed best to capture the essence of the stewardship personality traits associated with excellence in small protected area stewardship.

Using "strong dedication to conservation" as an umbrella personality trait, the statement can be made that at all 16 examples of excellence studied, this attribute of excellence was evident. Dedication -- strong commitment combined with love of the land -- appears to be an underlying factor that made the original vision to protect these outstanding natural areas a reality and that makes ongoing protection possible, despite numerous and persistent obstacles to effective small protected area stewardship.

The importance of people to successful small protected area management is evident from a cross-case study analysis of all 11 characteristics.

From the summary analysis of Table 3.3, some general conclusions regarding characteristics associated with successful management of this sample of small protected areas can be made. First, the high frequency of occurrence of each characteristic across case studies (75% to 100%), confirms that the attributes of excellence identified are common to this diverse set of small protected areas. The relative importance of each attribute; however, varies from site to site. For example, although ecological restoration was important to management effectiveness at three sites, there are two small protected areas where restoration work was not done. In one case, it is not required because the area is ecologically intact and it remains undisturbed because of the strong protective measures in place. In the second situation, ecological restoration was believed to be philosophically wrong.

The top four attributes (in terms of most frequently explicitly stated as important to management success) are

- (1) strong dedication of staff and volunteers to successful protection (63%);
- (2) community involvement (56%);
- (3) partnerships and networks (56%), and
- (4) advocacy work (50%).

Note that all four of these characteristics involve people: people committed to conservation; people willing to work co-operatively to attain conservation objectives; and people working to foster more advocates for the small protected area under their protection, for the organization, and for the broader conservation goals in general.

CONCLUSION

The purpose of this paper was to present a broad-level analysis designed to identify characteristics *associated* with peer-nominated examples of excellence in small protected area management. "Associated" is emphasized because with the cross-sectional research design used in this study, I am unable to differentiate if a characteristic is a cause or a consequence of successful management. Moreover, although thematic content analysis (used both deductively and inductively) was a useful analytical technique to identify themes associated with success, I had difficulty moving beyond a rudimentary understanding of relationships among these themes even at the single case-study level. For this reason, the conclusions are presented as characteristics associated with successful small protected area management and I make no attempt to hypothesize relationship among themes. Future studies designed to understand how management approach characteristics function together to form an effective management are required.

Placed in order from the highest to lowest frequency of occurrence (across the 16 small protected areas studied), the characteristics associated with excellence in conservation management are summarized by the following "attributes of excellence":

1. strong dedication of stewards to protect and who believe their work makes a difference to larger conservation efforts (100%);
2. an increase in functional ecological size through direct land acquisition or co-operative management efforts (100%);
3. a clear mandate (100%) supported by a management plan (88%) ;
4. research, monitoring, and evaluation to know the protected area and its essential linkages to the larger landscape; how landscape processes, pressures and species are changing;

and how management approach is impacting the protected area's long-term ecological integrity (100%);

5. partnerships and networks to "get the job done" with limited funds and staff, and to put a large scale management focus into action (100%);
6. visitor controls to ensure long-term protection and to provide a positive nature experience (100%);
7. advocacy work, especially at the regional level to foster recognition, understanding, and support of protection goals (94%);
8. community involvement to enhance integration between the protected area and the local community (88%);
9. a large-scale management focus involving long-term protection of ecological processes both within and beyond the small protected area boundary (88%);
10. ecological restoration (88%);
11. people, facilities, and other mechanisms that help visitors, if visitation allowed, to understand and connect with the special intrinsic values of the protected area (88%);
12. a high level of support for protection of the site (81%);
13. innovative management approaches to achieve protection (75%);
14. continuity in management staff (44%).

Although the above attributes were common to most of the 16 examples of excellence studied, they were not evident at all the sites, nor were they equally weighted in their relevance to achieving excellence in conservation management. Therefore, from this study it is evident that what is done to achieve "excellence in conservation management" is a context based. That is, management actions at one site may be inappropriate or detrimental at another small protected area. Specific examples include implementation of a visitor education/interpretation program or an ecological restoration program. Accordingly, all the above characteristics may not be applicable to all small protected areas.

However, the high frequency of occurrence (100%) of six attributes (steward personality, having a clear mandate, research and monitoring, partnerships and networking, minimization of visitor impacts, and increasing the functional size of a small protected areas) suggests that these are priority areas for small protected area management, and thus should be given special attention both by practitioners and researchers.

In addition, I suggest that some of the characteristics associated with successful protected area management are universal principles of effective management. For example other "excellence studies" indicate that a clear management focus; participatory leadership approaches; and the tenacity and adaptability to meet the management objectives, were keys to successful management of businesses (Peters and Waterman 1982) and government organizations (Brodtrick 1988).

This study re-affirms the current thinking in protected areas management, that is, that effective land conservation requires a holistic, integrated approach. In applying the landscape-level conceptual framework, I found that at 88% of the sites, the management approach could be generally characterized as a landscape-level management (as defined and measured in landscape-level management conceptual framework). Furthermore, 9 of the 14 "attributes of excellence" identified are similar to the themes associated with a landscape-level management approach, again as defined and measured in the conceptual framework. Here I specifically refer to the following attributes: "large-scale spatial and temporal management focus"; "community involvement"; "advocacy work"; "research and monitoring"; "partnerships and networks"; "ecological restoration"; "minimize visitor impact"; "maximize visitor experience;" and "functional size increase."

In addition, Grumbine's (1994:29) extensive literature review of the concept "ecosystem management," identified ten dominant themes, "that authors identified explicitly as critical to the definition, implementation, or overall comprehension of ecosystem management." The themes are "hierarchical context", "ecological boundaries", "ecological integrity", "data collection"; "monitoring", "adaptive management", "interagency cooperation", "organization change", "humans embedded in nature", and "values." With the exception of "adaptive management" and "organization change", all the dominant themes of ecosystem management identified by Grumbine, are encompassed by the "attributes of excellence" revealed in this exploratory study. "Adaptive management" and "organization change" were discussed by some of the managers I interviewed, but these themes were not emphasized across the 16 case studies.

This conclusion is not surprising, because as discussed, the general concept of holistic stewardship is widely discussed and advocated in conservation literature (Grumbine 1994), and is a common way of existence with numerous traditional societies (Goldsmith 1993). Of greater significance, in terms of contributing to the developing paradigm in protected areas management, are the context-specific management strategies used at the 16 models of excellence, that provide insight into *how* to implement landscape-level management.

In summary, an important conclusion to be drawn from this research is that no one site should be held up as "the paragon" of excellence in small protected area management. Each management program studied has achieved excellence as defined by the site's specific management objectives and within a specific regional context having both limiting and beneficial conditions. Nonetheless, each of the nominated examples of excellence have valuable lessons to offer regarding effective conservation management of ecological fragments. Accordingly, at the specific management action level, one could think of the various approaches discussed in this paper as a "smorgasbord" of possible approaches to be reflected upon, and if applicable, adapted to meet specific management objectives under specific management conditions.

LITERATURE CITED

- Bogdan, R.C. and S.K. Biklen. 1992. *Qualitative Research for Education: An Introduction to Theory and Methods*. Allyn and Bacon, Toronto, Ontario.
- Brodtrick, O. 1988. *Attributes of Well-Performing Organizations*, Extract from the Report of the Auditor General of Canada. Ottawa, Ontario, Ministry of Supply and Services.
- Burgess, R.G. 1988. *Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research*. JAI Press, Greenwich, Connecticut.
- Carney, T.F. 1972. *Content Analysis: A Technique for Systematic Inference from Communications*. University of Manitoba Press, Winnipeg, Manitoba..
- Carson, Rob. 1983. Island of broken dreams. *Pacific Northwest*. January/February: 34-42.
- Cooperrider, A.Y., R.J. Boyd, and H.R. Stuart. 1986. *Inventory and Monitoring of Wildlife Habitat*. U.S. Dept. Inter., Bur. Land Manage. Service Center, Denver, Colorado.
- Crandall, K., J. Leones, and B. G. Colby. 1992. Nature-based tourism and the economy of southeastern Arizona: economic impacts of visitation to Ramsey Canyon Preserve and the San Pedro Riparian National Conservation Area. Department of Agricultural and Resource Economics, The University of Arizona, Tucson, Arizona.
- Crow T. R. 1991. Landscape ecology: the big picture approach to resource management. Pp. 55-65 in D.J. Decker, M.E. Krasny, G.R. Goff, C.R. Smith, and D.W. Gross, eds., *Challenges in the Conservation of Biological Resources: A Practitioner's Guide*. WestView Press, Boulder, Colorado.
- Dillman, D.A. 1978. *Mail and Telephone Surveys: The Total Design Method*. John Wiley & Sons, New York, New York.
- Einsiedel, A. A, Jr.. and L.P. Brown. 1992 Is scientific expertise enough to be effective in parks management? Pp. 223-228 in *Science and the management of protected areas* (J.H. Willison, S. Bondrup-Nielsen, C. Drysdale, T.B. Herman, N.W. Munro and T.L. Pollock (eds.)). *Proceedings of an international conference held at Acadia University, Nova Scotia, Canada May 1991*.
- Fleming, Lanny. 1995. Coyote Lake a haven for life. *This Week*. Friday March 24:15.
- Fowler, F.J. 1988. *Survey Research Methods*. Applied Social Research Methods Series Volume 1. Sage Publications, Beverly Hills, California.
- Glaser, B.G. and A.L. Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine de Gruyter, Hawthorne, New York.
- Grosof, M.S. and H. Sardy. 1985. *A Research Primer for Social and Behavioral Sciences*. Academic Press, Toronto, Ontario.

- Harris, L.D. and P.B. Gallagher. 1989. New initiatives for wildlife conservation: the need for movement corridors. Pp. 11- 34. *in* Preserving Communities and Corridors. Defenders of Wildlife, Washington, DC
- Harwood, M. 1983. Protection for Protection arrives in nick of time. Audubon. January: 85-89.
- House, E.R. 1980. Evaluating with Validity. Sage Publications, Inc. Beverly Hills, California.
- Janzen, D. H. 1986. The eternal external threat. Pp. 286-303 *in* M.E. Soulé, ed., Habitat fragmentation in the temperate zone. Conservation Biology: The Science of Scarcity and Diversity. Sinauer Associates, Inc., Sunderland, Massachusetts.
- Kloos, P. 1988. No knowledge without a knowing subject. Pp. 226-236 *in* R. G. Burgess ed. Studies in Qualitative Methodology: Volume I Conducting Qualitative Research. JAI Press. Greenwich, Connecticut.
- MacKinnon, J., K. MacKinnon, G. Child, and J. Thorsell. 1986. Managing Protected Areas in the Tropics. IUCN, Gland, Switzerland.
- McNeely, J.A. 1989. Protected areas and human ecology: how national parks can contribute for sustaining societies of the twenty-first century. Pp. 150-157 *in* D. Western and M.C. Pearl, eds., Conservation for the Twenty-first Century. Oxford University Press, Toronto, Ontario.
- Morrison, R.I.G. 1987. The Western Hemispheric Shorebird Reserve Network: An International Conservation Strategy for Shorebirds. Canadian Wildlife Service.
- Noss, R.F. 1987. Protecting natural areas in fragmented landscapes. Natural Areas Journal 7(1):2-13.
- Odum, E.P. 1986. Introductory review: perspective of ecosystem theory and application. Pp. 1-11 *in* N Polunin ed., Ecosystem Theory and Application, John Wiley and Sons Ltd.
- Peters, T.J. and R.H. Waterman, Jr. 1982. In Search of Excellence: Lessons From America's Best-Run Companies. Warner Books, New York, New York.
- Riley, M.W. 1963. Sociological Research: A Case Approach. Harcourt, Brace and World, Inc. New York, New York.
- Rubec, C.D.A., A. Turner, N. Chartrand, and E.B. Wiken. 1990. Conserving Canadian ecosystems: a systems approach. Canadian Council on Ecological Areas. Occasional Paper No. 10. Compiled by J. R. Reid.
- Rubin, H. J. 1983. Applied Social Research. Charles E. Merrill Publishing, Toronto, Ontario.
- Saunders D.A., R.J. Hobbs and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: A review. Conservation Biology 5(1):18-34.

- Shafer, Craig L. 1990. *Nature Reserves: Island Theory and Conservation Practice*. Smithsonian Institution Press, Washington.
- Stake, R E. and J. A. Easley et al. 1978. *Case Studies in Science Education. Volume II. Design, Overview and General Findings*. Center for Instructional Research and Curriculum Evaluation. University of Illinois.
- Strauss, A.L. 1987. *Qualitative Analysis for Social Sciences*. Cambridge University Press, Cambridge.
- Suckling, G. 1982. Value of reserved habitat for mammal conservation in plantations. *Australian Forestry* 45 (1): 19-27.
- Tanner, J. 1990. Reluctant rebels: a case study of Edmonton high school drop-outs. *Canadian Review of Sociology and Anthropology*. 27(1):74-94.
- Thomas J.W. and H. Salwasser. 1989. Bringing conservation biology into a position of influence in natural resource management. *Conservation Biology*. 3(2):123-127.
- Thurston, H. 1990. Pp. 56-67. *in* *Tidal Life: A Natural History of the Bay of Fundy*. Camden House Publishing, Camden East, Ontario.
- Towl, A.R. 1969. *To Study Administrations by Cases*. Harvard University Business School, Boston, Massachusetts.
- Ugalde, A.F. 1989. An optimal parks system. Pp. 145-149 *in* D. Western and M.C. Pearl, eds., *Conservation for the Twenty-first Century*. Oxford University Press, New York, New York.
- Wiken, E.B, and K. Lawton. 1995. North American protected areas: an ecological approach to reporting and analysis. *The George Wright FORUM* 12(1): 25-34.
- Whyte, W.F. 1955. *Street Corner Society: The Social Structure of an Italian Slum*. University of Chicago Press, Illinois.
- Yin, R. K. 1988. *Case Study Research: Design and Methods*. Sage Publications. Newbury Park, California.

CHAPTER 4

RAMSEY CANYON PRESERVE: A CASE STUDY IN SUCCESSFUL SMALL PROTECTED AREA MANAGEMENT

INTRODUCTION

This paper is part of a larger study exploring successful stewardship approaches for small protected areas. Many protected areas are small (<1,000 ha). Despite their size, these places can contribute to a healthy landscape by reducing the impacts of habitat fragmentation, by conserving biodiversity, and by providing the catalyst to foster greater public support for land stewardship (Cole 1983; Harris 1984; Soulé and Simberloff 1986; Noss 1987; Reid and Miller 1989). A fundamental assumption of this study is that this contribution is largely dependent on management approach. Management is defined "as action toward desired end results" (Allen 1990). To determine effective management approaches for small protected areas, I am studying nominated "examples of excellence in conservation management" (Brown 1994). In this paper I present an in-depth case study of one highly recommended site -- Ramsey Canyon Preserve.

Ramsey Canyon Preserve, located in the eastern flank of the Huachuca mountains in southwestern Arizona (Figure 4.1), is a small (121 ha) protected area privately owned and managed by The Nature Conservancy. It is an internationally recognized birding destination, famous for its hummingbirds. However this site is home to much more than just hummingbirds; it also protects 17 rare and sensitive wildlife species, and a riparian habitat with nationally limited representation. Ramsey Canyon has been recognized as a biologically significant area since the late 1800s and was the first registered National Natural Landmark in the United States. To protect the rare species and habitats, access is limited in terms both of public visitation hours and of the number of visitors allowed in the Preserve at any one time.

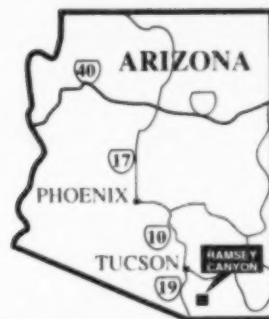


Figure 4.1. Ramsey Canyon Preserve, Sierra Vista, Arizona.

The goal of this in-depth case study analysis is to understand what characterizes excellence in conservation management at this particular small protected area, and to depict this information in a format useful to practitioners. Through inductive and deductive analysis of an exemplary management program, this research contributes to the evolving paradigm of land stewardship, specifically as it pertains to the challenge of protecting ecosystem fragments.

METHODOLOGY

Selecting Examples of excellence

Survey respondents (451 managers of public and private protected areas from across Canada and the United States) were asked to recommend a small protected area which demonstrated excellence in conservation management where "management" is defined as action toward desired end results. To obtain peer consensus, the list of nominated sites was reviewed by other protected area managers and professionals in conservation-related fields. Sites nominated several times were given the highest priority for case study analysis. Ramsey Canyon Preserve was one of the few places (6.9%) to be nominated three or more times, making it a prime site for in-depth case study analysis.

Case Study Protocol

The case study data sources include a written survey, an interview, management related documents (management plan, magazine articles, The Nature Conservancy -- Arizona Chapter newsletters, research reports, Chamber of Commerce birding brochure, and interpretive literature) and an on-site evaluation. The primary data source is a three hour

semi-structured interview with Tom Wood, the Preserve manager. The standard open-ended interview questions are listed below.

1. (a) Do you consider this protected area to be a site which demonstrates excellence in conservation management? (b) Why or Why not?
2. In what area(s) of management does this site excel?
3. What are the reasons for success in the areas mentioned above?
4. If you were starting over as manager of this site, name one thing you would do differently.
5. What are the most important things you have learned that would be valuable for other managers of small protected areas to know?
6. (a) What protected area would you recommend as a small protected area which demonstrates excellence in conservation management? (b) Why did you choose this site?
7. What 3 areas of management are priority for this site?
8. What mechanisms have been most effective in (a) increasing awareness of this site, (b) achieving positive community involvement, and (c) developing support for this protected area?
9. What is the most serious threat(s) to this site's long-term ecological viability and are any actions being taken to reduce these threats?
10. Who were the key people or organizations responsible for establishing this place as a protected area?
11. What are your future aspirations and stewardship goals for this place?
12. Are there any topics that I haven't asked about, that you think are important in terms of effective stewardship?

The interview was taped and transcribed verbatim to increase reliability of data collection and validity of data analysis. The mode of inquiry, termed "interactive-interpretive" by Serafin et al. (1992), involved the interview with the manager and follow-up discussions.

ANALYSIS AND RESULTS

Overview of Case Study Analysis

I used a combination of qualitative analytical tools to address the research question: "What characterizes excellence in conservation management at Ramsey Canyon Preserve?" Qualitative analysis of interview transcripts and related management documents assessed staff perceptions of what worked, and why certain actions were necessary to achieve successful management at this particular small protected area. Qualitative methodologies help maintain the holistic nature of case study data, especially the context of the system under study (Riley 1963; Smith 1988; Kloos 1988). Understanding context is important, particularly in this study, where ecological and social processes occurring beyond the artificial protected area boundaries are major determinants of ecosystem health (Machlis and Tichnell 1985; Odum 1986; Janzen 1986; Saunders et al. 1991; Einsiedel and Brown 1992).

The analytical tools include thematic content analysis and ethnographic interview analysis. I first apply thematic content analysis inductively to explore the substantive area in search of themes characterizing the management approach used at Ramsey Canyon Preserve. This analysis yielded an extensive amount of data which I used to check the validity of, and to elaborate upon, the results of ethnographic interview analysis. Ethnographic interview analysis -- the second analytical approach used to understand excellence -- represents the bulk of the analysis. I present the results in a developmental sequence that reflects the evolution of my understanding of relationships among management approach themes. I conclude this case study analysis with a technique that facilitates comparison of exploratory findings with current thinking in protected areas management: deductive thematic content analysis. A detailed overview of case study analysis is presented in Table 4.1.

Table 4.1. Overview of case study analysis.

Data Source	Analysis Applied	Information Revealed
Primary		
Interview transcripts	Inductive thematic content analysis	Major thematic categories and associated properties
	Ethnographic analysis	Illustrative anecdotes and examples
	Domain analysis	Fundamental categories of thought (domains)
	Taxonomic analysis of selected domains	Internal structure of domains (similarities)
	Componential analysis of selected domains	Internal structure of domains (distinctions)
	Thematic analysis	Relationships among domains
Secondary		
Management related documents	Inductive thematic content analysis	Thematic categories and associated properties
Site visit and field notes	Inductive thematic content analysis	Thematic categories and associated properties
Survey	Descriptive analysis	Site characteristics and data triangulation
All data sources	Deductive content analysis	Comparison of exploratory findings with current thinking in protect areas management

Thematic Content Analysis

Thematic content analysis is based on methodologies described in Glaser and Strauss (1967); Carney (1972); Strauss (1987); Bogden and Bicklen (1992); and Berg (1995). Content analysis facilitates objective and systematic coding, thereby increasing reliability in describing successful management approaches. It can be used both qualitatively and quantitatively. Here emphasis is placed on qualitative application, again to Preserve the context of the data and to provide rich, in-depth insights into exemplary management practices.

Thematic content analysis was applied to all case study data. The unit of analysis is the theme (subject matter of a sentence, or group of sentences), and its associated properties. At this stage of this case study analysis, I present only a summary of major themes (Table 4.2) related to the stewardship approach at Ramsey Canyon Preserve. Detailed results and anecdotes are presented in conjunction with the subsequent ethnographic interview analysis.

Although difficult to rank precisely, the themes identified using thematic content analysis are placed in general descending order of importance as signified by the amount of discussion about a given topic and the language (for example, the adjectives "critical" or "imperative") used in association with a given theme (Carney, 1972).

Table 4.2 Major themes and associated properties of Ramsey Canyon Preserve's management approach.

1. Visitor management -- limiting visitation is critical	10. Evaluation - verification of effective management
2. Mandate -- clear, steadfast, protection first	11. Private ownership -- an asset; important to effective protection
3. Well buffered -- essential for existence	12. Economic contributions -- significant but not obvious to local people
4. Multi-level management focus from species to watershed ecological health	13. Threats -- Preserve well buffered but not secure
5. Co-operation -- imperative	14. Local community -- perceptions and attitudes
6. Ambassador role -- occurs on and off site; telling and showing people to increase understanding of and support for The Nature Conservancy	15. Staff commitment -- more than just a job
7. Meaning of excellence -- balance protection with public visitation; minimize visitor impact, maximize visitor experience	16. Organization support system -- strong; includes both resource people and materials
8. Fundraising -- very successful	17. Respect -- for watershed, including human residents
9. Research and monitoring -- ecological and social; within and beyond Preserve boundaries	18. History of canyon -- ecological and social

Ethnographic Interview Analysis

To verify thematic content analysis results, and to move beyond a list of themes, I adapted a widely used technique called ethnographic interview analysis, developed by James Spradley (1979). Spradley (1979:156) describes ethnography as a "methodology designed for finding out both the explicit and implicit knowledge familiar to the most experienced members of a culture." Ethnographic interview analysis works on the assumption that linguistic symbols and their semantic relationships form the core meaning system of every culture. There are nine possible semantic relationships: strict inclusion, spatial, cause-effect, rationale, location for action, function, means-end, sequence, attribution. These relationships give meaning to linguistic symbols.

Although I was not doing an ethnographic study *per se*, I was interested in understanding a "culture," where culture is defined as a shared meaning system (Urión, personal communication). Each small protected area, its surrounding landscape, and the people who interact with it, form a type of culture. I wanted to understand the meaning of excellence at a particular small protected area through the manager's cultural knowledge and experience. I also wanted to avoid imposing my ideas, or theoretical ideas that would create a new, artificial structure.

Spradley's approach entails frequent interviews with one or more informants, to probe deeper and deeper into their understanding of their culture, and to verify one's own hypothesized understanding of that culture. I based my analysis on one verbatim interview transcript. As a central member of this culture, the manager became my key informant. It was through him that I was able to learn what "successful" means, who the players are, and what makes management work at this small protected area. Verification involved one follow-up discussion, and review of the final analysis by the manager. A more complete knowledge of successful protected area management at Ramsey Canyon Preserve would be gained by interviewing the manager more than once, and by interviewing other key informants such as local community members, other land managers in the region, and other staff.

Ethnographic interview analysis begins with a broadly focused analysis of domains. At this stage, it parallels thematic content analysis, in that it identifies key attributes associated with successful management. A domain (fundamental category of thought) is the basic and most important unit of analysis in ethnographic research (Spradley 1979). Domain analysis

provides a preliminary overview of the cultural scene, in this case, an overview of what excellence in management means at Ramsey Canyon Preserve. The next step is the more narrowly focused taxonomic and componential analyses, which reveal internal domain structure. Ethnographic analysis moves back again to a broad focus with the final step -- cultural thematic analysis, which provides the most useful insight into the meaning of successful management by showing the inter-relationships among domains. Cultural thematic analysis can be used to develop models of cultural meaning at various levels of abstraction. In this case study, thematic analysis integrated the domains into two models, explained below.

Domain Analysis

The interview transcript was thoroughly reviewed twice for domains. Domain analysis of the interview with the Ramsey Canyon Preserve manager elicited 92 domains, that I then regrouped into 10 inclusive domains (Table 4.3). For example, the larger domain -- "visitor control" -- includes 30 sub-domains, each expressing a single semantic relationship, such as: "protecting rare species *is a reason to* have visitor controls"; "limited parking *is kind of* visitor control"; and "having clear signage *is a way to* control visitors."

Table 4.3. Domain analysis of interview with Ramsey Canyon Preserve manager.

1. Management priority (protection mandate)	6. Management problems
2. Visitor control	7. Research -- ecological and social
3. Increase understanding and support for mandate	8. Evaluation of management actions
4. Management conditions -- organization, Preserve, region	9. Ecological health maintenance (protection and restoration)
5. Interests and concerns of folks	10. Co-operation and networking

Thematic content and domain analyses reveal different insights into characteristics of the management approach at Ramsey Canyon Preserve. For instance, terminology varies slightly between domains and themes; and while a domain tended to include clusters of ideas, a theme consisted of a single idea. Nonetheless the overall findings are congruent.

The Organizing Domain -- Protection-first Mandate

Domain analysis provides preliminary insights into the relationships among domains. For instance, it was evident that the "protection-first" philosophy was central to successful management. I therefore hypothesized that this philosophy was an "organizing domain" (one that brings together many others). The Nature Conservancy's mandate to protect rare species and their habitats is therefore central to management of Ramsey Canyon Preserve. The mission is clearly stated and is never compromised:

[w]e answer to our members and we have a clearly stated mission that we are here to protect rare species and anything we can do along with that is fine, but anything that impacted the rare species, there is no question about whether we would do it or not. We wouldn't do it.

Early in the interview, when asked why Ramsey Canyon Preserve is a example of excellence, the manager stressed how lucky they are to be managing privately held land, a situation that means they answer only to Nature Conservancy members. In contrast, many public land managers are "trying to please everyone," because they are responsible to taxpayers with their numerous and conflicting interests. The result is a multiple-use mission and no consistent direction from one day to the next.

Two of the many statements verifying that at Ramsey Canyon Preserve wildlife needs come first are as follows:

...when it comes right down to it, we are not here for the bird watchers, we are here for the birds. That's our constituency.

... we came up with a contingency plan. It was a whole level of a decision tree of what we might do, all the way from doing nothing to closing the canyon, depending on what the birds tell us.

As an aside, during a follow-up discussion with Tom Wood, he noted that the birds "told them" (via reduced breeding success) that they are disturbed by hikers. For this reason, one of the nature trails has been closed during breeding season and may be closed permanently.

How does the protection mandate translate into action at this site? At Ramsey Canyon Preserve protecting rare species means "looking at the ecosystem as a whole" and caring for the health of that ecosystem. As the manager notes, "We really want to have a healthy

sycamore-maple riparian forest in the canyon. If we do that, the rare species will look after themselves."

Protecting rare species also means working beyond the Preserve boundaries. Again I quote the manager:

... we also realize that we need to manage the whole ecosystem and that extends beyond the borders of the Preserve too. Our little three hundred acre Preserve is not secure. It is affected by a lot of outside influences. We are very fortunate in that the Forest Service Wilderness Area surrounds us on three sides. So we don't have the problems of development all the way around us and things like that. But there are still questions of fire management and wilderness use and other things that affect us.

This is an important statement. The Ramsey Canyon Preserve is fortunate to be 75% buffered by 8,156 hectare wilderness area, and yet the manager states that the Preserve is still not secure. Its insecurity is a result of its very small size and the effects of "outside influences."

Taxonomic and Componential Analyses -- Management Problems

It became apparent that understanding "outside influences" and actions taken to minimize these and other management problems, was a useful way to understand excellence at Ramsey Canyon Preserve. I explored the domain "management problems" using taxonomic and componential analyses. These findings were compared, combined with results of thematic content analysis.

To develop a taxonomy of management problems, it is necessary to identify a single semantic relationship that shows similarities among symbols in the way the informant sees them. Domain analysis indicated that *kinds of* management problems was a common semantic relationship. The manager discussed 16 kinds of management problems (see Table 4.4 - contrast set). Management problems included current problems at the Ramsey Canyon Preserve, past problems, and problems at other natural areas. This analysis suggests that a "problem" at Ramsey Canyon Preserve means anything that interferes with protecting rare species and their needs.

The meaning of a linguistic symbol is further comprehended by looking at how a symbol differs from other symbols. To understand management problems, it therefore is necessary

to know the differences between management problems. Componential analysis enables the researcher to organize contrasts (kinds of management problems) in a systematic fashion and to discover the components of meaning for any contrast set. Management problems varied along six dimensions: (1) problem origin; (2) whether or not it was an outside influence; (3) the effects of the problem; (4) how the manager initially knew and continued to assess the problem; (5) actions taken to address the problem; and (6) the current status of the problem at the Preserve.

Examination of the dimensions of contrast for each management problem in Table 4.4 provides the following insights into problem characteristics and management style at Ramsey Canyon Preserve:

1. All management problems are the result of inappropriate human actions and attitude that directly or indirectly affect the Preserve. Forty-four per cent are directly due to some type of misunderstanding.
2. The majority (93%) of problems are "outside influences." The most serious threat to long-term ecological viability is pending catastrophic fires and resultant severe flooding due to a fire suppression policy. This would have severe consequences for human and non-human residents of the canyon alike.
3. Many (69%) problems have negative ecological impacts. The remaining 31% may decrease support for the Preserve, the organization or both.
4. Frequent informal and formal research projects identify problems, problem status, and management evaluation.
5. Management actions addressing problems include planning, maintaining ecological health through protection and restoration of species and ecosystems, and developing greater support and understanding of The Nature Conservancy mandate. Many actions involve communication and co-operation with people beyond Preserve boundaries.

Table 4.4. Taxonomic and componential analysis of domain -- "management problems."

DIMENSIONS OF CONTRAST						
CONTRAST SET	Problem Origin	"Outside" Influence?	Effects of Problem	Knowledge of Problem	Management Actions Addressing Problem	Current Status of Problem at Preserve
Small size (300 A)	Historical- private land donation (112 ha)	NA	High vulnerability to external threats which impair ecological health	Fact	Purchase of Mile-Hi resort (20 A), co-operation with colleagues in watershed to keep buffer healthy, working with colleagues to increase upper buffer. Preserve design has a land acquisition contingency plan. Limitation on visits to minimize disturbances.	Minor because 75% buffered but could become a major problem if buffer deteriorates.
Rapid human encroachment	?	Yes	Increased external threats and reduced ecosystem health.	Fact	Co-operation with colleagues in watershed to keep buffer healthy, working to increase upper buffer. Development of good relations with neighbours and local community. Economic contributions of wildlife conservation made known.	Moderate problem because of wilderness buffer but conflicting land uses pose a constant threat.
Exotics	Human encroachment	Yes	Impairs native riparian ecosystem	Monitoring of riparian vegetation	Exotic species removed on a regular basis.	Minor compared with other natural areas
Uncontrolled publicity	Hype publicity based on misinformation	Yes	Too many visitors. Wrong visitor expectations resulting in negative visitor attitudes, staff stress, and damaging public relations.	Visitor reactions and comments	Tight control on all publicity and a strong communication program on site to ensure people understand the sensitivity, seasonality, purpose, and limitations of the place.	Moderate, improving.
Overcrowding	High popularity of natural areas but not enough land and/or visitor numbers not controlled	Yes	Disturbance of natural processes, damage fragile species and diminishment of visitor experience	Records of visitor numbers and visitation trends. Evaluation of visitor impact	Establishment of a set carrying capacity and limitations on visitors. For example, no school programs since class size exceeds trail limits. Visitor limitations are increased as required. Controlled publicity.	Common natural area problem in AZ, but not here since annual public visitation capped at 30,000 in 1987.
Inappropriate preserve visitor behaviors	Visitors do not read rules or disregard them. Inadequate rule enforcement	Yes	Disturbance of natural processes, damage to fragile species and diminish visitor experience	Resident manager and trail patrols regularly monitor what is happening on the preserve	Limitation on visitors and spend a lot of time with public. Application of trespass laws when necessary. Monitoring of rare species. Increase in trail patrols and signage as necessary.	Minor due to tight visitor control and legal backing of preserve rules.
"Right" number and placement of signs	?	No	Poor communication of rules versus bombardment of rules	Visitor reactions and comments	Experimentation with signage	Minor
High deer population	Caused by loss of large predators	Yes	Impair natural processes. Artificially reducing deer population is a "public relations nightmare"	Monitoring of deer populations	Respecting natural predator-prey relationship by keep buffer healthy, minimize disturbance to predators with small trail system and zoning.	Not a problem here because predators still inhabit watershed

DIMENSIONS OF CONTRAST						
CONTRAST SET	Problem Origin	"Outside" Influence?	Effects of Problem	Knowledge of Problem	Management Actions	Current Status of Problem at Preserve
Public lands "trying to please everyone"	Mixed mandate.	Yes	Inconsistent management of public lands. Ecological health of watershed subject to external forces and interests, such as grazing, mining, forestry and recreation.	Comments from colleagues	Work closely with colleagues and have monthly meetings. Informal management agreement with the Forest Service.	Potentially serious problem since anything that disturbs the watershed impacts the preserve's well being. The preserve avoids this problem with a clear single focus mission.
Inappropriate visitor behaviors or overcrowding in buffer	?	Yes	Negative impacts on sensitive species and habitats.	Monitoring of rare species in buffer and monitor visitors as necessary.	Work closely with the Forest Service. (e.g. develop a contingency plan to avoid disturbance of rare birds in the wilderness area). Increase signage and trail patrols.	?
Public opposition to controlled burns	Misinformation ("Smoky the bear", Yellowstone Fires sensationalized publicity).	Yes	Prevents fire policy decisions based on current knowledge of natural fire regimes. Exacerbates high fuel load problem.	Talking with colleagues.	Interpretation of burn areas to increase public understanding of the role of fires and the importance of controlled burns.	Serious but public beginning to understand the need for controlled fire.
Catastrophic fire & resultant severe flooding	High fuel load due to Forest Service fire suppression policy. Ecologically flawed policy continues because of public opposition to prescribed burns.	Yes	Impair watershed health. Potential to "wipe out" Preserve and destroy canyon.	Fire suppression history and recent severe fires and floods in region. Talking with colleagues.	Work with Forest Service; controlled burns on Preserve; interpretation of burn areas to increase public understanding of fires, share common concerns with neighbours, no smoking rule.	Serious problem, noted as most serious threat to ecological viability. No policy change yet but public opinion improving.
Population decline of a rare species, <i>Lilium parryi</i>	Severe flooding resulting from catastrophic fires caused by fire suppression policies.	Yes	Unknown impact on ecosystem. Failure to meet mandate.	Regularly monitor rare species.	In co-operation with several conservation agencies, development of a species recovery plan involving short-term and long-term management actions.	Population increasing due to species level management, but ultimate watershed-level threat (high fuel load) remains.
Negative feelings toward Preserve or organization	Perception that preserve doesn't contribute to local community because organization is tax-exempt.	Yes	Little of no support for mandate. May interfere with mandate.	Comments from people.	Eco-tourism study to quantify contribution, work with the Chamber of Commerce and other community groups. Make contributions and eco-tourists visible. Talk with community members.	Moderate, improving.
Poor relations with neighbours	Suspensions about the preserve and The Nature Conservancy.	Yes	Little of no support for mandate.	?	Meet regularly with neighbours; discuss concerns, respect neighbours private property rights, stop visitor actions which may annoy neighbours, promote local B & B.	Not a problem anymore but relations could change if neighbours move.
Private in-holdings on land above Preserve	Historical - land owner patterns of the region.	Yes	Biologically rich unprotected area in upper watershed. Threat to watershed.	Research regarding sources of threats to preserve.	Develop a contingency plan (Preserve design) regarding potential land acquisitions. Assist Forest Service in efforts to protect this critical area.	Potential major problem.
SUMMARY	All problems human caused. 44% directly due to lack of understanding.	Majority (93%) of problems are due to "outside influences."	Many (69%) problems have negative ecological impacts. 31% may decrease support for preserve, organization, or both.	Regular informal and formal "research" identifies problems, problem status and management evaluation.	Management actions in response to problems can be grouped into 3 functions: planning, ecological health maintenance and advocacy work. All functions involve communication and co-operation with people beyond preserve boundaries.	Management actions have avoided or minimized the majority (60%) of problems. Verification of effective stewardship.

Taxonomic and Componential Analysis of Stewardship Functions

Through taxonomic and componential analyses of "management problems," I came to understand that implementing the protection mandate essentially means avoiding or minimizing threats to rare species. This process is achieved through four interactive stewardship functions: (1) knowledge function, (2) planning function, (3) ecological health maintenance function, and (4) ambassador function. Further analysis of each stewardship function, again using taxonomic and componential analysis, with verification and elaboration by thematic content analysis results, provides rich insight into what excellence in conservation management means at this small protected area. It was at this stage of the ethnographic interview analysis that a stewardship model briefly summarized below, began to emerge (see also Figure 4.2).

Achieving the protection mandate is dependent upon the ecological health of the watershed and public support for a healthy watershed. "Ecological health" and "public support" therefore are indicators of successful management at Ramsey Canyon Preserve. These indicators are continuously monitored, as are the effectiveness of specific management actions in achieving the protection mandate. This evaluative information feeds back into the baseline knowledge, with plans and management actions adjusted accordingly. The ecological health maintenance and ambassador functions act on the information gathered (via the knowledge functions -- baseline and evaluation) and the information organized into various management plans (via the planning function). Controlled visitation is critical to both the ecological health maintenance and ambassador functions. As will be shown, successful implementation of all four functions requires action and co-operation beyond the Preserve boundaries.

The above stewardship model overview is provided to give context to the following section. I would like to stress, however, that model development was an evolutionary process. With analysis of each stewardship function (described in detail below), tentative inter-relationships were hypothesized, and components of the model were revised and refined. It was not until the final thematic analysis, however, that the complete model was developed.

Knowledge Function -- Baseline Information

The knowledge function can be summarized as, "knowing what needs to be done to protect Ramsey Canyon." This case study clearly demonstrates that protection requires

comprehensive knowledge of the Preserve and knowledge beyond the Preserve boundaries as well. This knowledge is gained through traditional research, such as ecological monitoring and visitor surveys. In addition, much important knowledge is gained through informal networking with colleagues, neighbors, local community members, and visitors. Examples include an annual open-house for canyon residents, informal chats with neighbors, regular face-to-face communication with visitors, informal bioregional-focused conferences, and monthly meetings with watershed colleagues. These examples demonstrate the variety of informal and meaningful ways used to gather knowledge of the region and its people, whether local residents or temporary visitors. Through these networking opportunities, the staff learn what people are thinking, they hear public reaction to Preserve management, and they gain insights into misunderstandings. As a consequence, regional cohesion develops as people discuss common concerns and interests related to this unique and fragile canyon.

Looking at the dimension of contrast "knowledge of problem" (see Table 4.4) we see that knowing how to protect the canyon involves (1) ecological monitoring of rare species (2) understanding the region's biophysical trends (3) keeping track of visitor-related information and (4) tuning into regional attitudes and perceptions.

1. Ecological Monitoring

Knowledge of problems was primarily gained through regular monitoring of rare species to "keep a good handle" on their health. Ramsey Canyon staff have detailed information on the rare species located on and off the Preserve. For example, staff were aware of a drastic population decline of a rare lemon lily (*Lilium parryi*) and they knew the location of the remaining two plants. Ecological monitoring also provides insights into ecological health, primarily at the species level. However, there is still much to be learned about the measurement of ecological health. As the manager commented, "it is hard to really quantify the health of an ecosystem." He further states that, "there is a need to develop ecological models for our rarest elements including the ecosystem as a whole just to get a better feel for what sort of pressures and processes they need."

Detailed knowledge of a protected area can lead to some exciting discoveries such as rare endemics that add value to a Preserve visit. For instance, Ramsey Canyon Preserve can boast of being the only known location of the Ramsey Canyon Leopard Frog (*Rana subaquavocalis*).

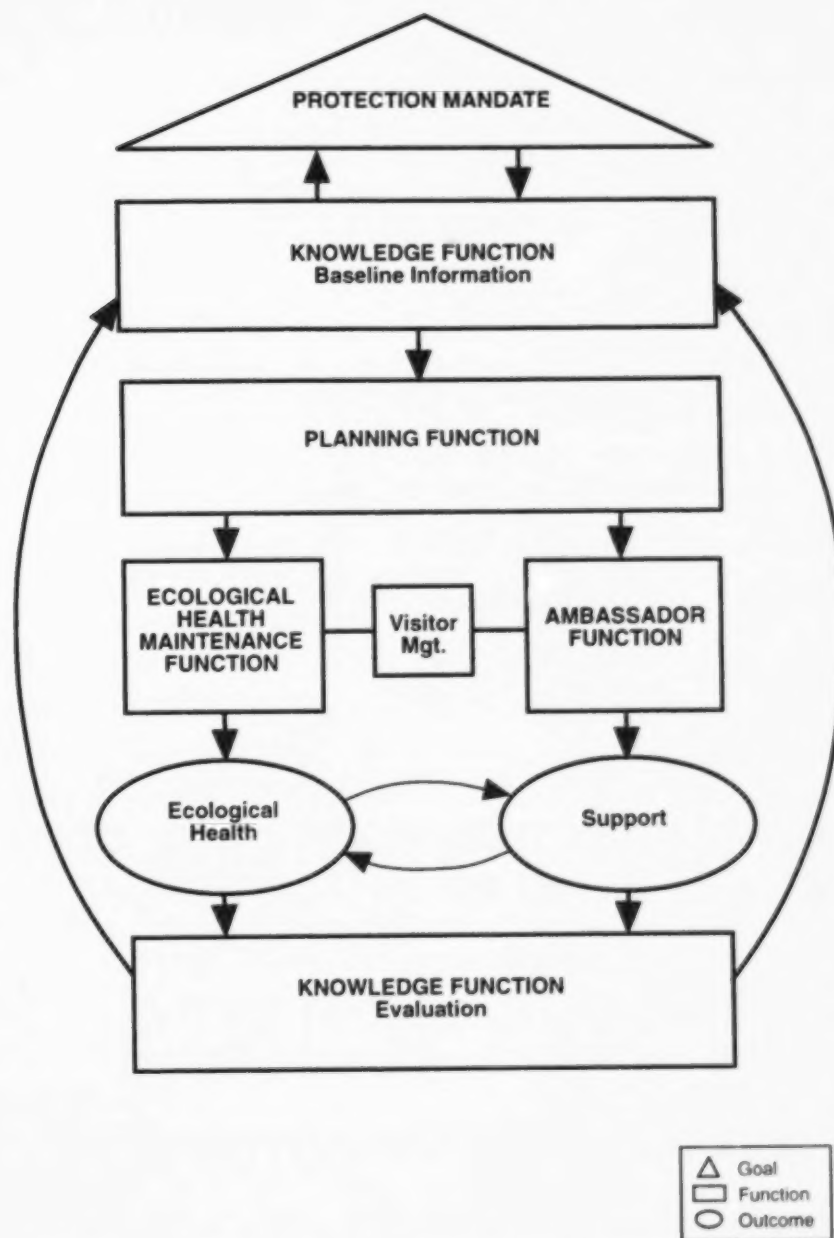


Figure 4.2. Ramsey Canyon Preserve pathway to excellence model.

2. Biophysical Trends

Awareness of the region's biophysical history is important to assess problem origins and appropriate management actions. For example, regional knowledge of fires indicated that low intensity fires every 8 to 10 years were characteristic of the region's normal fire

regime, yet fires had been suppressed for over forty years (Wood 1992). Decline of the lemon lily was determined to be "an artifact of fire management practices." Consequently, hands-on management to restore the lily was felt to be justifiable. Had the decline been natural, Preserve staff believe that human intervention would not have been appropriate.

3. Visitor Information

Public visitation and its associated problems, such as over crowding and inappropriate visitor behaviors, can be major threats to fragile species and habitats. In addition, negative visitor experiences can undo efforts to develop support for The Nature Conservancy and its mandate. To ensure the mandate is not being compromised by public visitation either directly or indirectly, staff keep careful record of visitor numbers, behaviors, comments and impacts on rare species and other canyon inhabitants -- including local residents. Along with the baseline ecological data, visitor information makes it possible to assess visitor management techniques in relation to the protection mandate. Related to visitor information, is the importance of knowing the benefits of visitation. At this study site, an ecotourism economic study demonstrated that the Preserve and other regional eco-tourism destinations contribute over three million dollars (US) annually to the local economy (Crandall et al. 1992).

4. Regional Attitudes and Perceptions

As shown in the summary of Table 6.4, the problems experienced at Ramsey Canyon Preserve can all be traced back to human misunderstanding. Not surprisingly then, knowledge of regional perceptions of the Preserve and of The Nature Conservancy is needed to address outside influences. Important questions include, "What are the sociological barriers to meeting the mandate beyond the Preserve boundaries?"; "Do the locals understand and support the need to protect Ramsey Canyon and land conservation in general?"; and "What kind of information or actions are needed to transform non-supporters into supporters?" To illustrate, the discovery that some people think hummingbirds are the only reason to visit this place, signals the need to communicate the canyon's numerous other features. This communication message aids in shifting a common public perception of parks as "roadside attractions."

The above types of information facilitate recognition of current or potential threats to rare species. It is this awareness of threats that largely influences specific actions encompassed by the other three stewardship functions. In return, evaluation of specific actions related to

the planning, ecological health maintenance, and ambassador functions, feeds back into the knowledge function, which then determines whether management approaches are working or need to be changed. Also, through the ambassador function, discussed below, this information is transmitted to the public and helps to counteract management problems caused by misunderstandings.

Planning Function

Addressing management problems at Ramsey Canyon Preserve involves several types of plans including: (1) the Preserve design; (2) recovery plans; and (3) species protection plans.

1. Preserve Design

The general management plan, called a Preserve design, reaffirms management direction by stating conservation objectives. The plan also reviews information on key rare species, highlights physical and social conditions of the canyon, such as past and current relations with neighbors, and prioritizes management actions by reviewing threats and their status. The Preserve design is used proactively to assess potential threats and to explore possible future scenarios and contingent actions for each scenario. The Preserve design also provides management continuity.

2. Recovery Plans

Plans are used to assist in restoring both threatened rare species and disrupted natural processes. For example, ecological monitoring of the rare lemon lily alerted staff to its sharp population decline. Before a recovery plan could be developed, however:

[t]he first issue to be addressed before any meaningful recovery plan could be considered was the reason for the population decline in Ramsey Canyon. If it was found to be a natural decline, not the result of human activity, then intervention would not be appropriate. If, on the other hand, the decline was an artificial situation, then management to reduce the decline was called for (Wood 1992).

The planning process hinged on knowing if the decline was natural. This reflects an underlying philosophy evident in the stewardship approach at Ramsey Canyon Preserve where natural processes are respected foremost. Recovery plan development involved a cooperative approach with four conservation agencies. This plan was dependent on knowing population trends, location of species both on and off the Preserve, fire and flood history of the region over several decades, and past regional land management practices among other things.

To mitigate the most serious problem at Ramsey Canyon Preserve -- high fuel loads -- the manager identified the need for a Preserve fire management plan and an upper watershed prescribed wildfire plan to restore the natural fire regime. The latter represents a greater challenge because of public opposition to controlled burning.

3. Species Protection Plan

A third type of plan used to achieve the protection mandate is the species protection plan. Visitor and ecological monitoring studies indicated that the nesting failure of the rare eared trogon (*Euptilotis neoxenus*) was possibly caused by human disturbance (Williamson 1992). Based on this knowledge, a contingency plan indicated that further monitoring was required, and that "depending what the birds tell us," closing a trail, or even the entire upper canyon, were possible options to prevent future disturbances. The protection plan placed the needs of the birds first, demonstrating consistency with the mandate and respect for the natural regime. Characteristic of the management style at this case study site, the contingency plan was co-operatively developed with the Forest Service.

Moreover, problem analysis also indicates that the overall management approach at Ramsey Canyon Preserve is an attempt to replicate, rather than manipulate natural processes. This approach requires knowing the larger spatial and temporal socio-ecological picture. It also requires co-operative and proactive contingency plans to address the dynamic factors impairing protection of rare species. Specific management actions to address problems group into two closely related stewardship functions -- the ecological health maintenance function and the ambassador function.

Ecological Health Maintenance Function

The goal of the ecological health maintenance function is to ensure that the needs of rare species are met. It is evident at this small protected area that knowledge of what is "natural" for the region, and knowledge of factors impairing species and ecosystem health, form the foundation on which most ecological health maintenance actions are based. At Ramsey Canyon Preserve protective actions: (1) minimize interferences, and (2) restore threatened species and natural processes. The ecological health maintenance function is multi-level working along the species-watershed continuum. It is guided by respect for the natural regimes of the canyon, and it requires working closely with regional public land agencies.

1. Minimizing Interferences

Steps taken by The Nature Conservancy to minimize interferences to Ramsey Canyon and its inhabitants include working with the Forest Service to increase protection of the upper watershed, communicating and enforcing private property rights, obtaining water flow rights to Ramsey Creek, and working with the Forest Service to establish a policy to let wildfires burn in the watershed under safe conditions.

Related to direct human impacts, disturbances are minimized by closing the Preserve or specific areas during critical wildlife feeding and breeding periods, by limiting visitor numbers, by strictly regulating visitor behavior, and by detouring people away from sensitive areas. These restrictions occur primarily on the Preserve, but the Preserve staff also work closely with watershed colleagues to minimize human impacts in the wilderness buffer, as was illustrated with the eared trogon protection plan.

2. Restoring Health

Restoration work is implemented only if ecological deterioration is due to human interference. In the case of the lemon lily (*Lilium parryi*), restoration techniques included hand-pollination of the two remaining plants, seed planting and seed bank storage. Restoration of disrupted natural processes includes controlled burns in the Preserve, and ongoing removal of alien species that impair native riparian vegetation. With regard to the controlled burns at Ramsey Canyon Preserve, the manager comments that, "what we do on the Preserve is small potatoes compared to what goes on in the watershed." Ultimately successful restoration depends upon changing the Forest Service fire suppression policy, which in turn depends upon public opinion. The prescribed burned area, located along side one nature trail, "is interpreted to try and turn the tide of public opinion to the fact that fire is a natural process and we need it." So here we see the important linkage between ecological actions and advocacy work.

Ambassador Function

As we have seen above, protection of the wilderness buffer -- essential to long-term ecological health of Ramsey Canyon Preserve -- is dependent upon working with all the folks linked with the watershed, to increase their understanding and support for an ecologically healthy region. The ambassador function works toward developing allies for conservation which in turn minimizes threats to protecting rare species and their habitats.

Increasing support for the mission of The Nature Conservancy to protect rare species and their habitats is the primary goal of the ambassador function. Support comes in the form of financial donations, memberships to The Nature Conservancy, and co-operative relationships with colleagues, visitors, neighbors and local community members. Each form of support improves management's ability to meet the protection mandate. Gaining this support is largely contingent upon increasing public understanding of human impacts on ecosystem health, of the importance of protecting ecosystems, and of The Nature Conservancy's involvement in this undertaking.

At Ramsey Canyon Preserve, allowing public visitation is fundamental to the success of the ambassador function. At first there is an apparent contradiction between the protection mandate and allowing public visitation. Public visitation can be very damaging to fragile natural areas, especially one as small as Ramsey Canyon Preserve. Uncontrolled public use has the potential to "trash the place," while controlling public visitation is very labor intensive. So why allow visitors?

The answer relates to the threats to long-term protection of the canyon. Problem analysis indicated that most problems are human-caused, by outside influences beyond the manager's direct control. To increase public comprehension of the need to protect the canyon and other natural areas, it seems that people need to see and experience tangible evidence of conservation's benefits. This holds true for Nature Conservancy members, for non-member visitors, for the local community, and especially for traditionally non-supportive groups, such as real-estate agents.

At Ramsey Canyon Preserve, allowing public visitation is an effective way of showing people what The Nature Conservancy is all about. As the manager states, "that is one of the reasons that we do accommodate the number of visitors that we do. It is kind of an ambassador or show case of what we do. And we get lots of members, we get lots of support."

Another reason for accommodating visitors is that the donations and money raised from the bookstore and cabin rental make Ramsey Canyon Preserve a potent fund-raiser -- so potent that they raise thousands of dollars above and beyond their operating budget. The surplus funds are used to help manage other Nature Conservancy preserves in Arizona that have no public visitation or that do not have the established clientele to be financially self-sufficient.

Yet another reason for allowing visitors is that revenue generated through nature tourism benefits the local community as well as The Nature Conservancy. As noted, this small protected area makes a substantial and continuous financial contribution to the region.

While allowing public visitation is beneficial, it is crucial that visitor numbers and behaviors are controlled. The manager clearly states, in many different ways throughout the interview, that allowing public visitation can only lead to increased support if visitors do not interfere with protecting rare species. For example, he comments:

We have about 30,000 visitors per year right now. If we just threw the gates open and put a sign on the highway, we would double that no problem at all. But in doubling that we would destroy what people are coming here for and what we are here for.

To balance public visitation and protection, a very effective visitor management program is in place at Ramsey Canyon Preserve. Taxonomic analysis of "ways to control visitors" elicited 36 different techniques. Visitor management begins off-site with an attempt to filter visitation by diverting casual visitors, promoting other birding areas, and publicizing Preserve limitations and sensitivities. At the Preserve gate there are both temporal and spatial restrictions. The Preserve is only open from 8 a.m. to 5 p.m. If the Preserve is open, then access is limited by space availability. The manager noted that limiting visitor numbers is critical to successful protection. The simplest and most effective mechanism used to limit visitor numbers at Ramsey Canyon Preserve is through limited parking (12 parking spaces are available). If space is available and the visitor wishes to hike one of the nature trails, he or she must obtain a trail permit (which lists all the Preserve rules) from a staff person at the bookstore. There are two trails and only 12 people are allowed on a trail at one time. As noted earlier, one trail may be closed to further reduce disturbance to wildlife by visitors. Visitors are allowed in the restricted area only on special staff-guided hikes. The remainder of the Preserve is off limits to visitors. Many visitor controls also function as an educational opportunity. An example of an educational visitor control technique is having a staff person work at the gate to explain why it is necessary to restrict visitor numbers. Through this effective, but labor intensive visitor management program, Ramsey Canyon Preserve is able to meet the elusive balance between protection and visitor use. This balance is achieved because management, both at the site and organization level, strongly adheres to the protection-first mandate. A separate paper describing in detail Ramsey Canyon Preserve's exemplary management approach is in progress.

Controlling public visitation is essential to demonstrating the benefits of good land stewardship. This statement is expanded upon with a closer examination of the ambassador function. The ambassador function has four dimensions: (1) transforming visitor expectations; (2) providing meaningful nature experiences; (3) making the benefits of conservation visible; and (4) fostering community cohesion. Each dimension contributes to the long-term protection of the canyon through development of an understanding and supportive citizenry.

1. Transforming Visitor Expectations

People need to know what a Nature Conservancy Preserve is and is not. Two messages are made clear at Ramsey Canyon Preserve. First, the Preserve is private property, and a visit is therefore a privilege not a right. Second, the sole purpose of the Preserve is wildlife protection. In an individualistic society, where parks traditionally are perceived as public leisure grounds, this concept is not new. Accordingly, the staff have the challenge and responsibility of ensuring that people know what is expected of them when visiting the Preserve.

This case study also reveals that educating people about the sensitivity, seasonality, need for advance reservations, and visitor restrictions in place *before* visitors arrive is most effective. This advance communication not only prepares people, it helps to filter visitation by discouraging those people who just want an outdoor experience. Pre-visit education is accomplished with tight control over publicity, such as brochures, media releases, magazine articles, and tourism promotional material. Proper visitor preparation sets the stage for a positive nature experience at Ramsey Canyon Preserve.

2. Providing a Meaningful Nature Experience

Providing a meaningful nature experience is dependent on the protection-first policy. Strict regulations help maintain a healthy ecosystem capable of supporting a wide diversity of wildlife, numerous migrant species, and an outstanding concentration of rare species, which combine to make Ramsey Canyon an attractive place to visit. The protection first policy facilitates an uncrowded, intimate nature experience. Opportunities to interact one-on-one with staff further enhances the quality of the visit.

At this exceptionally well managed site emphasis is placed on personal, one-on-one communication. The manager comments that, "the intensity and the amount of individual

contact that we have with these people is important." The staff take the time to chat with everyone, and in turn, visitors get to know the staff. Personal interaction leads to greater financial support, it is a way to communicate important messages, such as the reason for visitor restrictions, and it provides an opportunity to hear about the visitor's experiences, thereby increasing knowledge of the Preserve. Limiting visitor numbers makes this kind of meaningful interaction possible.

A meaningful nature experience makes a good impression both on members who see "where their money goes" and for non-members who see "something they want to support." Making a good impression on the "nature lovers" is important, but as the manager comments, "we don't need to convince these people that we need to save Ramsey Canyon." Long-term protection occurs when stewardship efforts convince traditionally non-supportive folks that the canyon needs to be protected. Developing new allies for conservation is mainly achieved by making the benefits of conservation known.

3. Making the Benefits of Conservation Visible

Although this protected area is making important contributions to local people, these contributions are largely unknown. Benefits of protecting Ramsey Canyon include opportunities for quality nature experiences; eco-tourism dollars; security derived from locally based economic diversification; preserving regional beauty, a sustained water source to desert-based communities, and protection from catastrophic fires and flooding.

To gain public support, these benefits need to be promoted. Tangible evidence, such as that provided by the eco-tourism study, is a powerful stewardship tool. At Ramsey Canyon Preserve the benefits of conservation are promoted primarily through community outreach work. Some innovative techniques include developing "I'm here for the wildlife buttons" to make eco-tourists visible to local businesses; participating in community birding festivals to impress upon the local people the economic impacts of eco-tourism; and working with the Chamber of Commerce to produce a brochure promoting the area's many great birding destinations. The latter technique has the dual function of encouraging tourists to visit the region, while taking visitation pressure off the canyon. An important outcome of the ambassador function is increasing awareness of the benefits of protecting Ramsey Canyon and other natural areas in the region. Recognizing these benefits may be the first step in fostering community cohesion.

4. Fostering Community Cohesion

Fostering community cohesion, that is, cohesion between the Preserve and the community-at-large, is the fourth dimension of the ambassador function. In the early years, The Nature Conservancy organization and the Preserve staff were perceived as outsiders with some ulterior motive. The Preserve has gained community status by respecting property rights of neighbors, hosting open houses to share common concerns and experiences related to the canyon, being actively involved in community events, demonstrating Preserve benefits, and consistently keeping to their mission. Continuity in staff and having a resident manager also may be important factors in community cohesion. Trust and respect have transformed local perception of Preserve staff from outsiders to valued community members.

The ambassador function can be summarized as communication with the "folks" who are directly or indirectly linked with the canyon, impact its health, and thus influence management's ability to meet the protection mandate. By transforming visitor expectations, providing positive nature experiences, demonstrating the benefits of good land stewardship, and fostering community cohesion, Ramsey Canyon Preserve is a very powerful ambassador for The Nature Conservancy, and for conservation initiatives in general.

Knowledge Function -- Evaluation

The knowledge function is sub-divided into *baseline information* (discussed previously) and *evaluation* (discussed here). As this function's name denotes, the goal of evaluation is to determine effectiveness of management actions in meeting the protection mandate. Detailed examination of the above stewardship functions suggest that "watershed health" and "citizen support" are paramount to successful protection. I therefore suggest that "watershed health" and "citizen support" are the desired products of the ecosystem health maintenance and the ambassador functions, respectively. As such, they can also be considered primary indicators of successful management at Ramsey Canyon Preserve.

Watershed health and citizen support are equally important and reciprocally related to meeting the protection mandate. For example, since many management problems are caused by lack of understanding, it is reasonable to assume that long-term protection depends upon an informed and supportive citizenry. In return, the watershed must be healthy to gain citizen support from members -- who want to see rare species and their habitats protected; visitors -- who want a positive nature experience; neighbors -- who want a safe home; and local community members -- who want a secure water source and

economy. If watershed health is damaged by over-use or exploitation, then the watershed would cease to provide these benefits.

I suggested above that "watershed health" and "citizen support" are primary indicators of successful management at Ramsey Canyon Preserve, however both indicators are difficult to measure. An indirect measure of effectiveness is gained by evaluating management actions and their impact on reducing threats to rare species. For example, the dimension of contrast "current status of problem at Preserve" (Table 4.4) indicates that, overall, the severity of problems is on the decline. The most serious problem, and primary determinant of ecosystem health, is the disrupted fire regime. Other threats are either minor or have been minimized by management actions. For instance, negative attitudes toward the Preserve because of its tax exempt status have been reduced, and in some cases even reversed. One such example is the local Chamber of Commerce's opposition to a congressional bill that would have eliminated The Nature Conservancy's tax-exempt status. Some common natural area management problems have been avoided by having a strict mandate and by limiting visitation. Knowledge gained by evaluating management actions provides an indication of whether ecological health and support for the mandate are improving or degenerating. This information then feeds back into baseline knowledge of the Preserve and is used to guide future management actions.

Cultural Thematic Analysis -- Models of Successful Land Stewardship

The "final" stage in ethnographic analysis is cultural thematic analysis. Thematic analysis, "searches for relationships among domains and how they are linked to the culture as a whole" (Spradley 1979:94). It is used to organize domains into a larger pattern, and thereby can be used to gain a holistic understanding of what excellence in conservation management means at this small protected area. Two models associated with excellence in conservation management at Ramsey Canyon Preserve are presented.

The "pathway to excellence" model (Figure 4.2) provides a general overview of the stewardship approach at Ramsey Canyon Preserve. Operating at a more abstract level is the "respecting landscape linkages" model (Figure 4.3). An underlying respect for the landscape and all its inhabitants, reflected by the "respecting landscape linkages" model, is the philosophical foundation of the pathway to excellence model.

Pathway to Excellence Stewardship Model

This model is the product of intensive analysis of two key domains -- "kinds of management priorities" and "kinds of management problems." It is clearly evident that at Ramsey Canyon Preserve protection is the top management priority. As mentioned, the protection mandate was hypothesized to be the organizing domain. Taxonomic and componential analyses verified the mandate as the organizing domain. Accordingly it was placed at the beginning of Ramsey Canyon Preserve's "pathway to excellence" model. The mandate to protect rare species essentially determines what are problems and what is needed to address these problems. Leading from the protection mandate are the management actions that address interferences to protecting rare species and their habitats. Although these actions are closely related and interactive, they can be grouped into the four distinct stewardship functions already described.

Although the functions are shown as separate entities, they should not be viewed as a formal step-wise progression of discrete management steps. The components of the model are closely inter-connected, occur simultaneously, and are constantly adapting to the social and ecological regional scene. A specific example is the threat of catastrophic fires and floods that could wipe out the canyon. If the ambassador function is not successful in counteracting the false public perception that fires are unnatural, the fire suppression policy will continue, and the high fuel load will remain as the one threat that could undo all previous management achievements. The Preserve's track-record in protecting the canyon and the community's perception of the Preserve, in turn influence management's ability to change public attitudes about fires. Ramsey Canyon Preserve's "pathway to excellence" will no-doubt continue to evolve with the ever-changing inter-play between this small protected area and the landscape that sustains it.

Respecting Landscape Linkages Model

What the pathway to excellence model does not show are the latent aspects of successful land stewardship at Ramsey Canyon Preserve. In looking at how the protection mandate is implemented, there is evidence of an underlying philosophy of respect. Although the manager uses the word protect, the word *respect* seems to capture more accurately the subtle ways the mandate is implemented. To respect something, according to *The Concise Oxford Dictionary* (Allen 1990), is "to avoid interfering with, harming or interrupting; to treat with consideration." Respect for natural watershed processes and dependent canyon life, is the dominant principle at Ramsey Canyon Preserve. This respect is embodied by

the protection-first mandate. No management action is conducted if it in anyway interferes with or degrades the canyon life. Visitor management also embodies a philosophy of respect. Although rules are strictly enforced, visitors are treated with consideration. This attitude is evident in the way the manager empathizes with people's varied interests in the land and also in the way the manager understands, rather than criticizing, people's general lack of ecological knowledge. Staff take the time to educate visitors; to tell people why protecting the canyon is important and how certain behaviors can affect its vitality; and to explain to the local community the benefits of protecting the Preserve, of having a healthy watershed, and of biodiversity conservation in general.

The management approach at Ramsey Canyon Preserve transcends traditional protected area management characterized by a "fortress mentality." Management actions often involve informal co-operation and networking with "folks" who live, work and depend on the watershed. This spirit of co-operation is captured by the following quote from the Preserve design, "we look forward to working with all interested parties to continue our stewardship of this special canyon."

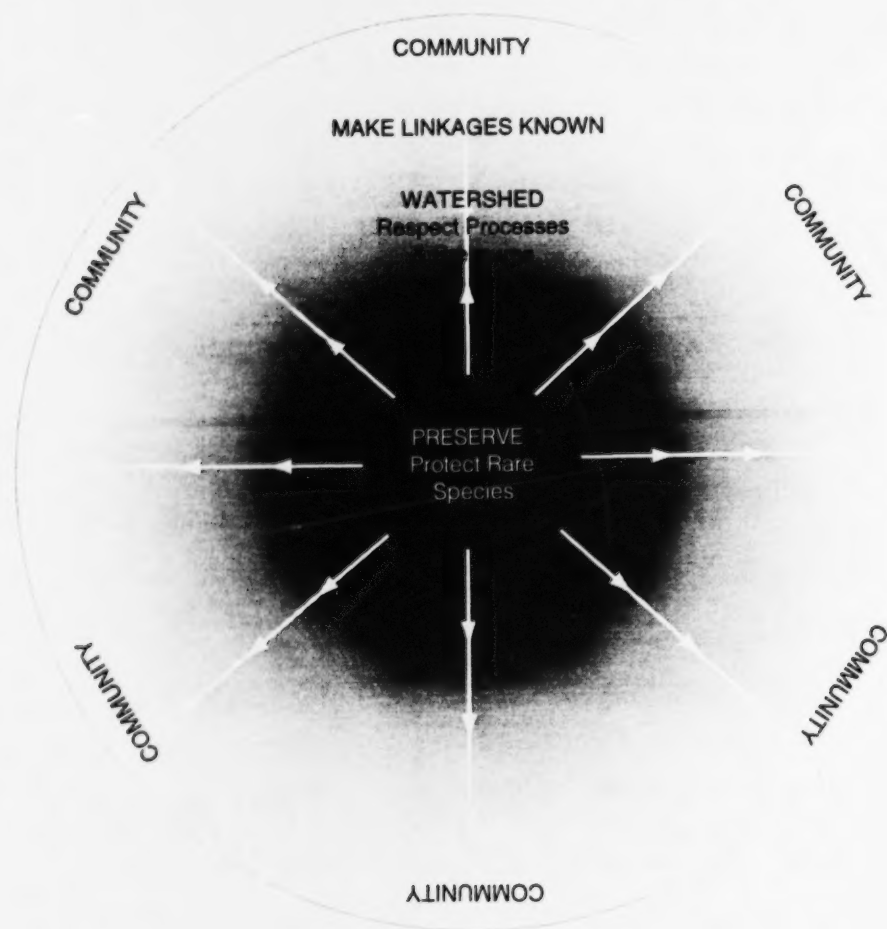


Figure 4.3. Respecting landscape linkages.

Deductive Content Analysis

Deductive content analysis is a form of thematic content analysis that facilitates systematic and objective comparison of communication messages with a theory or concept (Carney 1972). This application of content analysis is based on pattern-matching logic. As described by Yin (1988:109) such logic "compares an empirically based pattern with a predicted one."

I used deductive content analysis as the final line of inquiry into understanding successful management approaches at this small protected area. Here the "predicted pattern" is a landscape-level management approach. As stated earlier, ecological and social processes occurring beyond the artificial protected area boundaries are major determinants of ecosystem health. For over three decades now, it has been recognized that protected areas should be integrated into, rather than isolated from, their surrounding ecological and socio-economic region (UNESCO 1988). Variations of a holistic, integrated approach to land management -- such as "regional landscape approach" (Noss 1983); "multiple-use module" (Harris 1984); "ecosystem management" (Agee and Johnson 1988); and "holistic resource management" (Savory 1988), to name a few -- continue to be advocated. In this paper, I use the term "landscape-level management approach."

Small protected areas -- ecological fragments -- are particularly vulnerable to external threats. I therefore expected that small protected areas nominated as examples of excellence, such as Ramsey Canyon Preserve, would exhibit a landscape-level management approach. I tested this hypothesis qualitatively using deductive thematic content analysis. To define "landscape-level management approach" in a concrete manner, I developed a conceptual framework (Table 4.5) based on a management effectiveness checklist produced by an international group of experts in protected areas management (MacKinnon et al. 1986). These experts state that effective protected area management should ensure activities are socio-economically acceptable, politically feasible, and ecologically desirable -- key features of landscape-level conservation. I compared the framework with a wide selection of extant literature in protected areas management to verify its validity.

The framework was included as part of the written questionnaire, in which the manager was asked to indicate which management actions occurred and whether or not each action was adequate to meet management objectives. Using this conceptual framework, I was able to compare exploratory findings with current thinking in protected area management. This comparative analysis is presented in the following table.

Table 4.5 Management approach profile -- Ramsey Canyon Preserve.

MANAGEMENT OBJECTIVES: 1. Protect rare species 2. Maintain healthy riparian ecosystem 3. Educate public as to mission		
THEORETICAL LANDSCAPE-LEVEL MANAGEMENT APPROACH Adequate ✓ Inadequate IN None ✕	RAMSEY CANYON PRESERVE MANAGEMENT APPROACH	
RESEARCH		
Basic resource inventories	✓	Primarily inventories of rare species on and off Preserve
Socio-economic information	✓	Know traditional uses, history of area; local economy; local perceptions of Preserve; human-related threats
Ecological studies	✓	Species and processes studies; on and off Preserve; The Nature Conservancy assist Forest Service with research
Opportunities for outside researchers	✓	Often directly relevant to management
Other -- TNC element abstracts	✓	Background information on rare species developed by The Nature Conservancy's scientists
PLANNING		
Regional system plan	✓	Watershed focus
Written management plan	✓	
Specific, measurable objectives	✕	Short and long-term objectives, but objectives are not measurable, measurement at ecosystem level especially difficult
Research plan that supports management objectives	✕	

Public participation in planning	✗	<i>Not necessary because private land</i>
Other -- Land acquisition contingency plan	✓	<i>Identifies key areas for acquisition; inter-agency involvement</i>
Other -- Species recovery plan	✓	<i>Species to watershed focus; inter-agency involvement</i>
Other -- Visitor control contingency plan	✓	<i>Proactive visitor mgt. plan to protect rare species</i>
IMPLEMENTATION		
Implemented management plan	✓	<i>Noted as a valuable mgt. resource, along with The Nature Conservancy Stewardship Manual</i>
Financial program -- to ensure long-term financial stability	✓	<i>Number one time commitment (bookstore, cabins); very successful, \$35,000 over operational budget, support other Preserves</i>
Maintenance program	✓	<i>Volunteer assisted</i>
Land acquisition program	✗	<i>Not necessary at present time but contingency plan developed</i>
Ecological restoration program	✓	<i>Restoration of natural fire regime in watershed -- critical to protection mandate; volunteer assisted; interagency co-operation</i>
Mechanism to communicate with local community	✓	<i>Strong community outreach, regular communication with neighbors and local community</i>
Volunteer program	✓	<i>25 volunteers; also have work parties and opportunities to donate equipment, etc.</i>
Mechanism to involve surrounding landowners in management	✗	
Mechanism to contribute to local community	✓	<i>Significant economics benefits -- \$2.7 million per year to local economy; other economic spin-offs; working toward canyon fire protection</i>

Mechanism to facilitate co-operation with other agencies and institutions	4	<i>Regular meetings with regional land managers; excellent co-operation at watershed level; imperative to success</i>
Mechanism to allow public involvement in decision making	8	<i>Not necessary because private land</i>
Visitor management program	4	<i>Area of excellence; control visitor numbers; high visitor contact; restrictions have increased; occurs on and off Preserve; co-operate with Forest Service</i>
Conservation education program	4	<i>Second priority time commitment; primarily an advocacy function, important to prevent problems; occurs on and off Preserve</i>
Mechanism to enforce regulations	4	<i>Resident manager helps, strong enforcement capacity; enforcement of Preserve rules could be improved by increasing trail roving</i>
Other -- Advisory committee	4	<i>Scientists</i>
MANAGEMENT EVALUATION		
Monitored management plan	4	<i>Preserve design has been updated</i>
Ecological monitoring program	IN	<i>3rd priority time commitment; inadequate, especially at ecosystem level; occurs on and off Preserve</i>
Socio-economic monitoring program	4	<i>Monitor support level; very aware of impacts of visitors and other aspects of management. on neighbors; economic benefits documented</i>
Ongoing training	4	<i>Regional watershed focus conferences and other training</i>
Annual report	8	
Other -- Preserve managers monthly meeting	4	<i>Strong network among Arizona Preserve managers</i>

Other -- Visitor reaction studies	4	<i>Experiment with visitor management and monitor effectiveness e.g. number and placement of signs</i>
Other -- Visitor impact studies	4	<i>Occurs on and off Preserve; long-term trail impact studies; volunteer nest-monitors determine visitor impact on breeding birds</i>

The above comparative analysis indicates that a landscape-level approach is indeed in effect at Ramsey Canyon Preserve. Basic management processes (research, planning, implementation and evaluation) are balanced. Regional integration is evident in the strong emphasis on off-site work.

All management actions, with the exception of ecological monitoring, are adequate to meet management objectives. Highest priorities, are fundraising, conservation education (advocacy work), and ecological monitoring. The Ramsey Canyon Preserve management approach differs from the theoretical landscape-level framework in having (1) no *measurable* management objectives; (2) no research plan that supports management objectives; (3) no annual report; (4) no mechanisms to involve the public in decision making; and (5) no mechanisms to involve local landowners directly in management. The last two are considered to be unnecessary because the Preserve is privately owned. The lack of measurable objectives at the ecosystem level reflects the difficulties inherent in understanding and restoring natural processes.

CONCLUSION

What characterizes excellence in conservation management at Ramsey Canyon Preserve?

Based on comparative examination of extant literature in protected areas management and exploratory findings of this in-depth case study analysis, Ramsey Canyon Preserve's management style can be characterized as a landscape-level approach. This general finding is not surprising. As noted in the introduction, numerous authors have stressed that

effective land conservation requires a holistic, integrative approach, such as that embodied by the above conceptual framework.

Of greater usefulness are the context-specific characteristics that provide insight into *how* to implement landscape-level management. Specific characteristics associated with successful stewardship at Ramsey Canyon Preserve are organized into a management process model - the "pathway to excellence" model (Figure 4.2.)

It is very clear that having a "no-compromise, protection first mandate" is fundamental to success at this site. The protection mandate is implemented via four stewardship functions: (1) knowledge -- baseline information and evaluation; (2) planning; (3) ecological health maintenance; and (4) ambassador function. All functions rely heavily on networking and co-operation at the watershed level (including the local community) because even with a large buffer, the Preserve staff cannot afford to be complacent about external threats to the protection mandate. A large wilderness buffer is an asset; however, having a large buffer does not guarantee ecological security. In fact, the buffer's dangerously high fuel load is the Preserve's most serious threat to survival. Adequate management resources (human and financial) and strong legislation to enforce rules also are related to effective mandate implementation.

The exemplary visitor management program is central to excellence at this small protected area. It is the primary reason that The Nature Conservancy has achieved the difficult goal of balancing protection with public use. This is no minor accomplishment, considering that this 121 hectare Preserve accommodates 30,000 visitors annually. Because it has been able to show people the benefits of protection, Ramsey Canyon Preserve is a very effective ambassador for The Nature Conservancy and for conservation initiatives in general.

Two major conclusions can be drawn from this case study analysis.

The first conclusion pertains to common usage of the term "ecosystem management." At Ramsey Canyon Preserve it is very evident that it is people, not ecosystems, that require management. As demonstrated, human interferences are the primary obstacles to effective protection. I therefore suggest, as have others (Rowe 1992), that it is time for a new term. If taken literally, "ecosystem management" implies that we need, want, or even know how

to control ecosystems. At Ramsey Canyon this is not true. Karr (1992: 235) expresses the fundamental relationship between language and paradigmatic change:

[o]ur ability to change the world outpaces the ability of biological systems to respond to these changes. Even our minds and our language evolve too slowly to deal with the rate of environmental degradation. Our success as a world society depends on an environmental revolution -- on our ability, that is, to change our vocabulary and perceptions so that we can indeed protect ecological integrity.

Continued use of words like "ecosystem management," "natural resources," or "industrial development" only serve to perpetuate a philosophy of landscape domination.

The second conclusion relates to reversing landscape domination. How are we to learn to respect, rather than dominate, landscape communities? The implication from this case study is that small protected areas can play a vital role in re-shaping how we value, perceive and treat non-human nature. The common dilemma, in protected areas management, is trying to balance protection and public visitation. As demonstrated at Ramsey Canyon Preserve, achieving this difficult balance is possible, but only if protection takes precedence. Without a protection-first policy, the quality of a visitor experience would be severely compromised. Is this not a microcosm of the larger urgent challenge humans face in trying live in such a way that reconciles our desire for "good living" with the need to respect vital life processes? In a sense, protected areas are the "testing grounds" to determine our capacity to show respect for life -- not just species but life in its entirety. If we cannot achieve this on the small scale, at places designated as nature sanctuaries, the future is indeed grim.

Ramsey Canyon Preserve is a beacon of hope. It shows that a stewardship approach, respectful of landscape health, and respectful of people, can foster humility in Preserve visitors. That is, visitors learn to consider a visit to Ramsey Canyon Preserve a privilege rather than a right, and become willing to place the needs of canyon life above their wants.

Even more importantly, the stewardship approach at Ramsey Canyon promotes a philosophy of respect for landscape communities *beyond* the Preserve boundary. The stewardship approach at this example of excellence reaches into the community, taking the concept of land stewardship beyond the Preserve boundaries, and transforming this often foreign or threatening concept into a socially meaningful way to protect rural community

life. I believe that this larger regional influence, though still in its rudimentary stages, is the fundamental trademark of excellence of the Ramsey Canyon Preserve.

To conclude, excellence in conservation management at this small protected area involves first respecting the land, and second teaching people -- in a way that is respectful of human dignity -- why and how respect is necessary. Nurturing respect precludes domination. Hence, a management approach respectful of all life may be the essential first step toward re-harmonizing people and their bioregional homes.

LITERATURE CITED

- Agee, J.K. and D.R. Johnson (eds). 1988. *Ecosystem Management for Parks and Wilderness*. University of Washington Press, Seattle, Washington.
- Allen, R.E. 1990. *The Concise Oxford Dictionary of Current English*. 8th ed. Clarendon Press, Oxford.
- Berg, B.L. 1995. *Qualitative Research Methods for the Social Sciences*. 2nd ed. Allyn and Bacon, Toronto, Ontario.
- Bogdan, R.C. and S.K. Biklen. 1992. *Qualitative Research for Education: An Introduction to Theory and Methods*. Allyn and Bacon, Toronto, Ontario.
- Brown, Lesley P. 1994. Attributes of excellence in small protected area management -- preliminary findings. *Natural Areas J.* 14(1):62-63.
- Carney, T.F. 1972. *Content Analysis: A Technique for Systematic Inference from Communications*. University of Manitoba Press, Winnipeg, Manitoba.
- Cole, L. 1983. Urban nature conservation. Pp. 267-268 in A. Warren and F.B. Goldsmith, eds., *Conservation In Perspective*. John Wiley & Sons, Chichester, UK.
- Crandall, K., J. Leones, and B. G. Colby. 1992. Nature-based tourism and the economy of southeastern Arizona: economic impacts of visitation to Ramsey Canyon Preserve and the San Pedro Riparian National Conservation Area. Department of Agricultural and Resource Economics, The University of Arizona, Tucson, Arizona.
- Einsiedel, A. A., Jr. and L.P. Brown. 1992. Is scientific expertise enough to be effective in parks management? Pp. 223-228 in J.H. Willison, S. Bondrup-Nielsen, C. Drysdale, T.B. Herman, N.W. Munro and T.L. Pollock, eds., *Science and the Management of Protected Areas*. Proceedings of an international conference held at Acadia University, Nova Scotia, Canada, May 1991.
- Glaser, B.G. and A.L. Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine de Gruyter, Hawthorne, New York.
- Harris, L.D. 1984. *The Fragmented Forest: Island Biogeography Theory and the Preservation of Biotic Diversity*. The University of Chicago Press, Chicago, Illinois.
- Janzen, D. H. 1986. The eternal external threat. Pp. 286-303 in M.E. Soulé, ed., *Habitat fragmentation in the temperate zone*. *Conservation Biology: The Science of Scarcity and Diversity*. Sinauer Associates, Inc., Sunderland, Massachusetts.
- Karr, J.R. 1992. Ecological integrity: protecting earth's life support systems. Pp. 223-238 in R. Costanza, B.G. Norton, and B.D. Haskell, eds., *Ecosystem Health: New Goals for Environmental Management*. Island Press, Covelo, California.

- Kloos, P. 1988. No knowledge without a knowing subject. Pp. 226-236 in R. G. Burgess ed. *Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research*. JAI Press. Greenwich, Connecticut.
- Machlis G.E. and D.L. Tichnell. 1985. *The State of the World's Parks: An International Assessment for Resource Management, Policy and Research*. Colorado, Westview Press, Boulder Colorado.
- MacKinnon, J., K. MacKinnon, G. Child, and J. Thorsell. 1986. *Managing Protected Areas in the Tropics*. IUCN, Gland, Switzerland.
- Noss, R.F. 1983. A regional landscape approach to maintain diversity. *BioScience* 33:700-706.
- Noss, R.F. 1987. Protecting natural areas in fragmented landscapes. *Natural Areas J.* 7(1):2-13.
- Odum, E.P. 1986. Introductory review: perspective of ecosystem theory and application. Pp. 1-11 in N Polunin ed., *Ecosystem Theory and Application*, John Wiley and Sons Ltd.
- Reid W.V. and K.R. Miller. 1989. *Keeping Options Alive: The Scientific Basis for Conserving Biodiversity*. World Resources Institute, Washington, DC.
- Riley, M.W. 1963. *Sociological Research: A Case Approach*. Harcourt, Brace and World, Inc. New York, New York.
- Rowe, S. 1992. Ecosystem approach to wildlands and forest land management. Presentation to the Department of Forest Science February 26, 1992.
- Saunders D.A., R.J. Hobbs and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: A review. *Conservation Biology* 5(1):18-34.
- Savory, A. 1991. Holistic resource management: a conceptual framework for ecologically sound economic modeling. *Ecological Economics*, 3:181-191.
- Serafin R., G. Nelson and R. Butler. 1992. Post hoc assessment in resource management and environmental planning: A typology and three case studies. *Environ. Impact Assess. Rev.* 12:271-294.
- Smith, L.M. 1988. Broadening the base of qualitative case study methods in education. Pp. 28-33 in R. G. Burgess ed. *Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research*. JAI Press. Greenwich, Connecticut.
- Spradley, J.P. 1979. *The Ethnographic Interview*. Holt, Rinehart, and Winston, New York.
- Soulé, M.E., and D. Simberloff. 1986. What do genetics and ecology tell us about the design of nature reserves? *Biological Conservation* 35:19-40.

- Strauss, A.L. 1987. *Qualitative Analysis for Social Sciences*. Cambridge University Press, Cambridge.
- UNESCO. 1988. *Safeguarding our yestermorrows. Biosphere Reserves and the World Heritage Convention*.
- Urion, Carl, January 15, 1995. Personal Communication.
- Williamson, S.L., 1992. The eared trogon in Arizona: behavior, ecology, and management of the "northern quetzal." Ramsey Canyon Preserve research report.
- Wood, T. 1992. Management of a rare lily, *Lilium parryi*, at Ramsey Canyon Preserve. Ramsey Canyon Preserve research report.
- Yin, R. K. 1989. *Case Study Research: Design and Methods*. Sage Publications. Newbury Park, California.

CHAPTER 5

MARY'S POINT: A CASE STUDY IN SUCCESSFUL SMALL PROTECTED AREA MANAGEMENT

INTRODUCTION

This paper is part of a larger study exploring successful stewardship approaches for small protected areas. Many protected areas are small (<1,000 ha). Despite their size, these places can contribute toward a healthy landscape by reducing the impacts of habitat fragmentation, by conserving biodiversity, and by providing the catalyst for greater public support for land stewardship (Cole 1983; Harris 1984; Soulé and Simberloff 1986; Noss 1987; Reid and Miller 1989). A fundamental assumption of this study is that this contribution is largely dependent on the management approach adopted at each site. Management is defined "as action toward desired end results" (Allen 1990). To determine effective management approaches for small protected areas, I am studying nominated "models of excellence in conservation management" (Brown 1994). In this paper, I present an in-depth case study of one highly recommended site -- Mary's Point.

Mary's Point, situated in an economically depressed and sparsely populated area of New Brunswick's Bay of Fundy (Figure 5.1), is named after a Micmac woman who lived there in the late 1700s. This small protected area (188 hectares) owned and managed by the Canadian Wildlife Service, is one of three separate sections composing the 979 hectare Shepody National Wildlife Area. Mary's Point and the associated inter-tidal habitat also is designated as a Ramsar site and as a Western Hemisphere Shorebird Reserve.

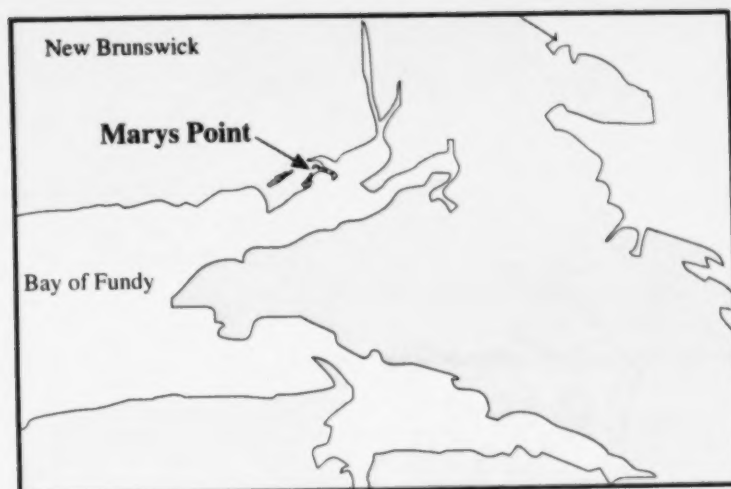


Figure 5.1. Mary's Point, Harvey, New Brunswick.

Mary's Point is described as, "an essential link in a chain of sites stretching from the shorebirds breeding grounds to the wintering areas" (Morrison 1987). It is an example of a small, yet critical, natural area essential to the survival of millions of shorebirds. The unique combination of a sheltered bay, expansive tidal flats teeming with mud shrimp *Corophium volutator*, and a sandy beach for resting during high tide, make it an ideal staging area for shorebirds undertaking a non-stop 4000 km journey to their South American winter home. Mary's Point is one of four known preferred sites along the Bay of Fundy's 1,052 square kilometer inter-tidal zone (Thurston 1990). Because only a few sites in the Bay of Fundy are used as traditional migratory staging areas, entire shorebird populations are at high risk. Morrison (1987) explains the situation as follows:

[d]uring their migration, they (shorebirds) depend on the health of a chain of critical coastal and wetland habitats. They concentrate in great numbers in a few locations along their pathways, at times with large proportions of entire populations at a single site. These concentrations put large numbers of birds and whole populations at risk from environmental threats.

In addition to environmental threats, shorebirds are exceptionally vulnerable to disturbances at high tide, when they gather along narrow strips of beach (Helmer 1990). Effective shorebird conservation requires protection of breeding, staging, and wintering habitats; and protection of the birds when they arrive.

The ecological significance and vulnerability of Mary's Point was first recognized in the early sixties by Dr. Mary Majka. Prior to this time, the point was virtually unknown to naturalists and it was being severely disturbed by traditional beach activities. For the past 17 years, Mary Majka and David Christie have voluntarily managed the area, in close co-operation with the Canadian Wildlife Service. The successful protection of Mary's Point is a fascinating story of chance, persistence, and co-operation.

The goal of this in-depth case study analysis is to understand what characterizes excellence in conservation management at this particular small protected area, and to depict this information in a format useful to practitioners. Through inductive and deductive analysis of an exemplary management program, this research contributes to the developing paradigm of land stewardship, specifically as it pertains to the challenge of protecting ecosystem fragments.

METHODOLOGY

Selecting Models of Excellence

Survey respondents (451 managers of public and private protected areas from across Canada and the United States) were asked to recommend a small protected area which demonstrated excellence in conservation management where "management" is defined as action toward desired end results. To obtain peer consensus, the list of nominated sites was reviewed by other protected area managers and professionals in conservation-related fields. Sites nominated more than once were given the highest priority for case study analysis. Mary's Point was one of the few places (6.9%) to be nominated three or more times, making it a prime site for in-depth case study analysis.

Case Study Protocol

This case study data sources include a written survey, an interview, management related documents (interpretive brochures, student job description, Western Hemisphere Shorebird Reserve Network brochure, and related publications) and an on-site evaluation.

The primary data source is a three hour semi-structured interview with Mary and David. Mary began the interview with a detailed explanation of how protection of Mary's Point evolved. We then discussed the following standard open-ended interview questions:

1. (a) Do you consider this protected area to be a site which demonstrates excellence in conservation management? (b) Why or Why not?

2. In what area(s) of management does this site excel?
3. What are the reasons for success in the areas mentioned above?
4. If you were starting over as manager of this site, name one thing you would do differently.
5. What are the most important things you have learned that would be valuable for other managers of small protected areas to know?
6. (a) What protected area would you recommend as a small protected area which demonstrates excellence in conservation management? (b) Why did you choose this site?
7. What 3 areas of management are priority for this site?
8. What mechanisms have been most effective in: (a) increasing awareness of this site, (b) achieving positive community involvement, and (c) developing support for this protected area?
9. What is the most serious threat(s) to this site's long-term ecological viability, and are any actions being taken to reduce these threats?
10. Who were the key people or organizations responsible for establishing this place as a protected area?
11. What are your future aspirations and stewardship goals for this place?
12. Are there any topics that I haven't asked about, that you think are important in terms of effective stewardship?

The interview was taped and transcribed verbatim to increase reliability and validity. The mode of inquiry I used -- termed "interactive-interpretive" by Serafin et al. (1992) -- involved one interview, two follow-up discussions, and review of this paper by the volunteer managers. In addition, the Canadian Wildlife Service was asked to review the analysis, due to their key role in protecting Mary's Point. This review process provided greater insight into management approach and importantly, it provided a validity check on data collection and interpretation.

ANALYSIS AND RESULTS

Overview of Case Study Analysis

I employ a combination of qualitative analytical tools to address the research question: "What characterizes excellence in conservation management at Mary's Point?"

Qualitative methodologies help maintain the holistic nature of case study data, especially the context of the system under study (Riley 1963; Smith 1988; Kloos 1988). Therefore, I applied qualitative analysis to interview transcripts and related management documents as a way to assess the volunteer steward's perceptions of what worked, and why certain actions were necessary to achieve successful management at this particular small protected area. Understanding context is important; especially in this study, where ecological and social processes occurring beyond the artificial protected area boundaries are major determinants of ecosystem health (Machlis and Tichnell 1985; Odum 1986; Janzen 1986; Saunders et al. 1991; Einsiedel and Brown 1992).

The analytical tools include thematic content analysis and ethnographic interview analysis. I first apply thematic content analysis inductively to explore the substantive area in search of themes characterizing the management approach used at Mary's Point. This analysis yielded an extensive amount of data, which I used to check the validity of and to elaborate upon the results of ethnographic interview analysis. Ethnographic interview analysis -- the second analytical approach used to understand excellence -- represents the bulk of the analysis. I conclude this case study analysis with a technique that facilitates comparison of exploratory findings with current thinking in protected areas management -- deductive thematic content analysis. A detailed overview of case study analysis is presented in Table 5.1.

Table 5.1. Overview of case study analysis.

Data Source	Analysis Applied	Information Revealed
Primary		
Interview transcripts	Inductive thematic content analysis	Major thematic categories and associated properties
	Ethnographic analysis	Illustrative anecdotes and examples
	Domain analysis	Fundamental categories of thought (domains)
	Taxonomic analysis of selected domains	Internal structure of domains (similarities)
	Componential analysis of selected domains	Internal structure of domains (distinctions)
	Thematic analysis	Relationships among domains
Secondary		
Management related documents	Inductive thematic content analysis	Thematic categories and associated properties
Site visit and field notes	Inductive thematic content analysis	Thematic categories and associated properties
Survey	Descriptive analysis	Site characteristics and data triangulation
All data sources	Deductive content analysis	Comparison of exploratory findings with current thinking in protect areas management

Thematic Content Analysis

Thematic content analysis is based on methodologies described in Glaser and Strauss (1967), Carney (1972), Strauss (1987), Bogden and Bicklen (1992), and Berg (1995). Content analysis facilitates objective and systematic coding, thereby increasing reliability in describing successful management approaches. It can be used both qualitatively or quantitatively. Here emphasis is placed on qualitative application, to preserve the context of the data and to provide rich, in-depth insights into exemplary management practices. In addition, content analysis can be used both inductively and deductively; and therefore is

useful in exploration of the substantive area (small protected area management), and subsequent comparison of results with existing ideas on effective land stewardship.

Thematic content analysis was applied to all data sources. The unit of analysis is the theme (subject matter of a sentence, or group of sentences) and its associated properties. Table 5.2 presents the major themes related to the stewardship approach at Mary's Point. Though it is difficult to rank precisely, the themes are placed in general descending order of importance as signified by amount of discussion time given to topic, and by the language used in association with a specific theme such as "very important" (Carney, 1972).

Ethnographic Interview Analysis

To verify thematic content analysis results, and importantly to move beyond a list of themes, I adapted a widely used technique called ethnographic interview analysis developed by James Spradley (1979). Spradley (1979:156) describes ethnography as a "methodology designed for finding out both the explicit and implicit knowledge familiar to the most experienced members of a culture." Ethnographic interview analysis works on the assumption that linguistic symbols and their semantic relationships form the core meaning system of every culture. There are nine possible semantic relationships: (1) strict inclusion; (2) spatial; (3) cause-effect; (4) rationale; (5) location for action; (6) function; (7) means-end; (8) sequence; (9) attribution. These relationships give meaning to linguistic symbols.

Although I was not doing an ethnographic study *per se*, I was interested in understanding a "culture", where culture is defined as a shared meaning system (Urion, personal communication). Each small protected area, its surrounding landscape, and the people who interact with the protected area, form a type of culture. I wanted to understand the meaning of excellence at a particular small protected area through the manager's cultural knowledge and experience. I also wanted to avoid imposing my ideas, or theoretical ideas that would create a new, artificial structure.

Table 5.2. Major themes and associated properties of Mary's Point management approach.

1. Co-operative management approach -- partnerships at local, provincial, national, and international levels. Noted as a reason for excellence.	8. Value -- small but critical area for shorebirds; international ecological significance; positive influence on local attitudes toward conservation; model Western Hemispheric Shorebird Reserve.
2. "Birds First" -- shorebird safety and needs are given top priority; reserve is for the protection of birds, not for tourism; level of disturbance has decreased nearly 100% since protective efforts began. Lack of disturbance makes this a model of excellence.	9. Fundraising skills -- important to know; funding is considered the limiting factor to achieving excellence.
3. Local volunteers -- knowledgeable and concerned about wildlife, adjacent landowner with an interest in conservation, community minded, skilled in research and fundraising. Dedication of volunteers is noted as reason for excellence.	10. Protected area networks -- reserve is not alone; it is part of a regional complex of small protected areas (Shepody National Wildlife Area) and it is part of an international network of shorebird reserves.
4. Local support for protecting birds -- change in local support from non-existent to high; support developed through a community-oriented approach to land stewardship, communication and patience.	11. Staff training -- students receive rigorous training in local natural and cultural history, interpretive skills, and shorebird ecology.
5. Public control -- very important; disturbances to birds are stopped by having controlled access, constant vigilance during migration, site interpretation and controlled publicity.	13. Evolution of management -- "these things take time." Excellence means: secure land; supervise reserve and educate people.
6. Education -- an important visitor management tool because of increased visitation and shifting visitor typologies -- from serious naturalists to curious spectators. Excellent interpretive facilities noted as a reason for excellence.	14. Recognition -- site went from no recognition to widespread recognition of area's importance; recognition at local, national, and international levels.
7. Exhaustive research --ongoing internationally co-ordinated research pieces together an amazing story of shorebird migration; done by volunteers, Canadian Wildlife Service and other scientists involved in the Western Hemispheric Shorebird Reserve Network.	15. Community benefits -- local employment, preservation of local historic sites, parochial pride, and free natural history education.

Spradley's approach entails frequent interviews with one or more informants, to probe deeper and deeper into understanding their culture, and to verify one's own hypothesized understanding of that culture. I based my analysis on one verbatim interview transcript. As central members of this culture, Mary and David became my key informants. It was through them that I was able to learn what "successful" means, who the players are, and what makes management work at this small protected area. Verification involved two follow-up discussions, and review of the final analysis by the stewards. A more complete knowledge of successful protected area management at Mary's Point would be gained by interviewing the volunteer stewards more than once, and by interviewing other key informants such as local community members, other land managers in the region, and Canadian Wildlife Service staff.

Ethnographic interview analysis begins with a broadly focused analysis of domains. At this stage, it parallels thematic content analysis, in that, it identifies key attributes associated with successful management. A domain (fundamental category of thought) is the basic and most important unit of analysis in ethnographic research (Spradley 1979). Domain analysis provides a preliminary overview of the cultural scene, in this case, an overview of what excellence in management means at Mary's Point. The next step is the more narrowly focused taxonomic and componential analyses, which reveal internal domain structure. Ethnographic analysis moves back again to a broad focus with the final step - cultural thematic analysis. This broad analysis provides the most useful cognizance of the meaning of successful management by showing the inter-relationships among domains.

Domain Analysis

The interview transcript was thoroughly reviewed twice for domains. Domain analysis of the interview with the volunteer stewards of Mary's Point elicited 47 domains. These were regrouped into 14 inclusive domains, and placed in general descending order based on emphasis given in the interview (Table 5.3). For example, the domain "co-operation" includes 16 sub-domains each expressing a single semantic relationship such as, "success is a result of co-operation," NB Federation of Naturalists is a kind of partner," and "always being in communication is a characteristic of the partnership."

Table 5.3. Domain analysis of interview with the volunteer stewards of Mary's Point.

1. Protection of birds	7. Obstacles to protection / concerns
2. Co-peration	8. Education / interpretation
3. Public use controls	9. Fundraising
4. Evolution of Mary's Point	10. Monitoring and research
5. Volunteer guardians	12. Site context
6. Local community	13. Validation of excellence
7. Characteristics of Mary's Point	14. Important things

Excellence Means Effective Shorebird Protection

Domain analysis identifies shorebird protection as central to the meaning of excellence in conservation management of Mary's Point. Shorebird protection is the reason the reserve was established, it is the top management priority, and it is the criterion by which success is judged.

At Mary's Point protection means minimizing disturbances to the birds and to the habitat (tidal flats, marshes, and beach) that provide the birds with food, shelter, and safe roosting areas. Disturbances to birds are stopped by having controlled access, constant vigilance during migration, and on-site interpretation. Protective actions are guided by a philosophy of non-interference with natural processes.

Controlled visitation is very important to effective protection. As Mary noted, "this place is too vulnerable and too small to be visited by more people than already are visiting." Related to effective visitor management is controlled publicity; promotion as a tourist attraction rather than as a sensitive, protected area brought visitors with incorrect expectations, confounding visitor problems; promotion during migration is no longer done because it caused exponential increases in visitation.

Successful shorebird protection at Mary's Point requires a clear sense of purpose. From the beginning, all management actions have been directed toward protecting the shorebirds. The protection message that shorebird safety comes first has been consistently and clearly conveyed to the public through actions, restrictions, and regular communication. Protection began with just the actual Point, but slowly evolved to include nearby marshes and other critical areas along the shorebirds' transcontinental migration pathway. During the interview Mary indicated the importance of visitors understanding the purpose of this small protected area:

[n]ow one thing that we always stress, this is very important, and our students are trained to say this all the time, that this area was not created to be tourist attraction. We try to stress in everything we do, the fact that, this area has been created solely for the protection of birds, not for the public. Furthermore, witnessing the spectacular shorebird migration is considered a privilege, I always tell people that we are privileged to be witnessing this phenomena, to see the migration. But only privileged and that privilege can always be removed.

Cultural Thematic Analysis

Evolution of Protecting Mary's Point.

I applied thematic analysis to determine the relationships among domains, thereby in an effort to develop an integrated understanding of the protection process at this small protected area. Spradley (1979:197) notes that, "one of the most useful strategies for discovering cultural themes is to select an organizing domain for intensive analysis." After analyzing several possible organizing domains, I found that "stages in the evolution of protecting Mary's Point" proved to be the most insightful. Details of the componential and taxonomic analyses of this domain are presented in Appendix C. The evolution is described below.

The evolution of Mary's Point began with Mary Majka -- a person with the sensitivity, compassion and perseverance to fulfill a personal mission to protect the shorebirds at

Mary's Point. The significance of the area, and the need for protection, was immediately recognized by Mary in 1963 when, by chance, she visited this beach in August during high tide, when thousands of migrating shorebirds were congregating on the beach to rest. She immediately knew the area must be protected. Mary retells her first visit to Mary's Point as follows:

[s]ome people built a little cottage down here. We knew those people quite well. The lady said, "You ought to come see the cottage, Mary, you like birds, there are just thousands of them." I thought she must be exaggerating, she must mean hundreds. It just happened that we arrived on a high tide when the birds were congregating and it was August and I was just absolutely speechless. But I also immediately saw how vulnerable this whole area was . . . people were swimming, and the kids were chasing the birds and there was the dog. And so there was a lot of disturbance and to my sensitive mind it was a terrible thing. We were guests so I didn't say anything. I stopped the children from throwing rocks and so on, but I couldn't hardly do anything. But I immediately started to think, this area ought to be protected.

This chance encounter, along with Mary's wildlife-related knowledge, empathy, and sense of responsibility, set into motion protection of Mary's Point.

In 1970, Mary suggested to the NB Southeastern School Region that Mary's Point be acquired as an outdoor education center. At this time the land owner was willing to sell and the region staff were supportive; however, funding never became available. Four years later, Mary presented the case to the Nature Conservancy of Canada, who promised \$25,000 for acquisition of approximately 40 hectares. This second attempt to secure Mary's Point failed because the landowner was no longer willing to sell.

In the mid sixties, David Christie -- a highly respected naturalist and equally dedicated conservationist -- joined Mary in her efforts to protect Mary's Point. They started informal shorebird observations at Mary's Point. Regular, formal surveys started in 1974, when Dr. Guy Morrison of the Canadian Wildlife Service (CWS) organized the Maritimes Shorebird Survey, and sought volunteers assist. Mary and David volunteered to survey Mary's Point, and began nearly weekly counts from May through Novembers. Dr. Morrison immediately recognized the importance of the area, especially for Semipalmated Sandpipers (*Calidris pusilla*). Volunteer shorebird survey work, along with CWS aerial surveys of the upper Bay of Fundy, pointed out the importance of Mary's Point, and led to its acquisition as part of Shepody National Wildlife Area in 1978. Through research, ongoing informal communication, and shared recognition of Mary's Point's ecological

significance, a very effective partnership between a government conservation agency and local naturalists emerged, and continues to this day.

In 1974, a property with the only beach access to the Point came up for sale, and was bought by Mike and Mary Majka and David Christie. Acquisition of this property facilitated voluntary supervision of the area, control of access, and creation of a protective buffer.

Serious efforts to prevent disturbances to shorebirds began in 1975. At times, Mary and David faced strong negative reactions from misinformed local people, but persevered, motivated by their strong dedication to protecting the shorebirds. About the negative community reactions, Mary comments that:

[y]ou know when you start being active, especially in a small community, this is bound to happen because you are putting new things in place, and some of those things are inconvenient or strange to people -- so they just react. But I guess I know in my own mind, I'm doing the right things, so I don't worry about it.

The ability to protect Mary's Point further increased four years later, when it was acquired by the government of Canada as part of the Shepody National Wildlife Area. With national legislation in place, Mary and David had more "clout" and the result was a marked reduction in shorebird disturbance. However, although national legislation increased enforcement capabilities, protection was not guaranteed because there were no government funds for on-site supervision or education. Consequently, Mary and David took it upon themselves to continue in their role as volunteer guardians of Mary's Point.

Involvement of the CWS led to this protected area's international recognition as a critical migratory staging area for over 500,000 shorebirds. Mary's Point was designated as a Ramsar site and then as a Western Hemispheric Shorebird Reserve, in 1982 and 1987, respectively.

Since the mid-eighties, disruptive recreational activities have stopped; however, increasing visitor numbers poses a new threat to shorebird safety. The increase in popularity caused a shift in the kind of visitors -- from predominantly serious naturalists, to more curious spectators. Consequently, there was a need for public visitor control measures and visitor education. These needs were addressed by hiring local laborers to build and maintain

interpretive facilities. Local youth are hired each summer as interpretive wardens. Tasks associated with having staff (fundraising, hiring, training, and supervision) are done on a volunteer basis by Mary and David. The NB Federation of Naturalists, plays a key role in successful management of Mary's Point because as an incorporated, non-profit society it is able to sponsor grant applications and act as employer.

Today, despite the high visitation rate (15,000 people from late June through to September), there is very little disturbance to the shorebirds who stop at Mary's Point to rest and refuel. Mary's Point is now considered to be a model Western Hemispheric Reserve because of the successful shorebird protection achieved through volunteer efforts and through a co-operative management approach.

Future evolution in the protection of Mary's Point will be shaped by the concern about escalating public visitation, and about the need to find replacement volunteers, from an economically impoverished and sparsely populated region, who are willing, and able to carry on the full-time volunteer work of David Christie and Mary Majka.

To summarize, the evolution of protecting Mary's Point, followed a cyclical process of research, sharing knowledge, and resultant increased recognition of this small protected area's critical importance to shorebird survival. Knowledge and recognition began with two local naturalists, then spread to national and international levels, that in turn, led to back to the local level, creating widespread community appreciation of Mary's Point. Co-operation is the underlying factor to successful protection of Mary's Point.

A Co-operative Protection Process

Co-operation is a dominant characteristic of the management approach at this small protected area. The management functions performed by the partners include research, land acquisition, site maintenance, visitor education, law enforcement, donation of facilities, public relations, handling of grant moneys, management plan development, and establishment of international linkages and support.

Co-operation at local, national and international levels is essential to effective shorebird conservation because disturbance at any of the major staging areas can be disastrous for entire populations (Myers et al. 1987). Local linkages were needed to change disruptive traditional uses, and to develop local reserve defenders. The national linkages were

important to land acquisition, stronger enforcement, additional management resources, extensive research, and most importantly, to expanding the local shorebird protection efforts far beyond the reserve boundaries. Through national involvement, Mary's Point was internationally recognized and linked with another key partner -- the Western Hemispheric Shorebird Reserve Network.

Outcome of the Protection Process -- Perception Change

The result of this co-operative protection process is a marked change in the *perception* of Mary's Point. In three decades, the perception of Mary's Point has been transformed -- from being an insignificant beach, the Point has become a place of high regard in the minds of the locals, naturalists, wildlife authorities, and international conservation groups.

Perception change was a slow evolutionary process. Limiting factors included initial lack of local support and lack of funding. Lack of local support, has been dealt with through ongoing communication, hiring community members, and ongoing patience. Mary notes that local people required time to understand and to see the beach "in a new light" -- "every time you start something like this, it has to take it's time for people to understand, to realize and to see the advantage of actually having such a place." As she was an outsider in a small community, it also took time for Mary's conservation efforts to be appreciated. In addition, Mary attributes her acceptance by the local people to her strong involvement in the community. For example, Mary and David maintain a popular community hiking trail, and Mary has raised money to save, restore, and operate local historical buildings.

Shortage of money continues to be a limiting factor. Although lack of funding has been overcome in the past through Mary's resourcefulness, adept fundraising skills, and excellent reputation with funding agencies, insufficient funds continues to be a limiting factor to successful protection. For example in 1995, there may only be funds to hire two (rather than four)s summer student staff, which may hinder protection efforts.

Table 5.4 highlights the changing perception of Mary's Point from the 1920s to 1995, the basis of each perception, and consequences both to the shorebirds and to the local community.

Table 5.4. Taxonomic and componential analysis of domain - "perceptions of Mary's Point."

DIMENSIONS OF CONTRAST				
CONTRAST SET	Awareness level	Basis for perception	Consequences for shorebirds	Consequences for local community
<i>Perceptions of Mary's Point</i>				
Local recreation area	Local residents	No recognition of area's significance by absentee owner, locals, naturalists, or wildlife authorities	No protection, very high disturbance level to birds and habitat High risk situation for individual birds and species populations	No controls on beach use
Vulnerable situation for shorebirds	One local naturalist	Chance discovery by the right person	Occasional observations of shorebirds; very minor decrease in disturbances	No controls on beach use
Important shorebird habitat	Two local naturalists	Knowledge derived from annual shorebird surveys	Summer-long supervision increases to year round supervision with Alaska purchase of adjacent property Moderate decrease in disturbance level Still some disturbance by motorcycles and dune buggies	Controlled beach access; beach users asked to not disturb birds or damage vegetation
National Wildlife Area - nationally significant wetland	Canadian Wildlife Service - Government of Canada	Knowledge derived from CWS research and annual shorebird surveys, CWS taking a greater interest in non game species	Federal protection, increased enforcement leverage for volunteer guardians; marked reduction in disturbance level	Beach uses restricted for protection of birds. Some confrontations with locals based on misunderstandings, other locals defend reserve
Ramsar Site - internationally recognized wetland	Ramsar Convention	Knowledge derived from CWS research and annual shorebird surveys	International recognition and co-operation, potential increase in shorebird protection with government's formal acknowledgment of area's international significance	International recognition of area
Western Hemispheric Shorebird Reserve and sister shorebird reserve in Surinam	Biologists, Western Hemispheric Shorebird Reserve Network	Knowledge derived from internationally co-ordinated shorebird research that Mary's Point is a vital link in the shorebird migration route	Internationally co-ordinated protection of critical shorebird habitats. Shorebird survival chances markedly increased since effective conservation depends on the health of all the links in the migration pathway	International recognition Local Bed and Breakfast hired to cater WHSR designation ceremony, 500 in attendance
Popular birding and tourist destination	Naturalist and general public	Media coverage, natural history information, and word of mouth	Minimal disturbance to birds due to constant beach supervision and visitor education, increased public understanding of shorebird conservation	Economic spin offs, local pride, increase in local interest, some locals experience shorebird migration for the first time
Local work opportunity	Local laborers	Local residents hired to build visitor facilities (warroom, interpretive trails, interpretive centre), and to maintain facilities	Increased understanding of reserve's importance and increased support for shorebird protection	Employment in an economically depressed area, laborers "see beach in a new light"
Local shorebird reserve	Many local residents	International recognition, economic spin-offs, and on site education	No vandalism or other acts of recreation; disruptive beach uses stop, some locals defend shorebird protection	Free natural history education through interpretive trails, interpretive centre, and staff
Local work opportunity	Local students	Local students hired to supervise and interpret site, visitor problems occur when supervision absent	Always somebody present on beach, any interference in birds stopped, increased support for shorebird protection	Harmonization between local community and shorebird needs Local summer employment and education opportunity for youth
Model Western Hemispheric Shorebird Reserve	WHSR managers, biologists, and regional conservation organizations	Success of co-operative management approach and volunteer achievements	Better understanding of migratory patterns and behavior of species, Move concern directed toward moult biology	Economic spin offs

Consequences of Perception Change

The consequences of a new perspective of Mary's Point, suggest that change in perception is a major determinant of successful shorebird protection. The shift in perception of Mary's Point made a significant difference to shorebird safety both at Mary's Point and beyond. When the site was perceived as a recreation area, thousands of shorebirds -- both individuals and entire shorebird populations -- were at risk when they stopped at Mary's Point to rest and refuel. Today the reserve has local defenders, disruptive beach uses have stopped, and there is no vandalism or other acts of resentment. Despite high visitation, there is minimal disturbance to the birds as a result of constant beach supervision during high tide and increased visitor understanding of the vulnerability of shorebird migration.

The changed perception of Mary's Point also has resulted in protection beyond the boundaries: nationally with expanded shorebird habitat protection in the Bay of Fundy, and internationally through a global reserve system.

The evolving perception of Mary's Point also affected local residents. In the beginning some locals were annoyed with the restrictions placed on beach activities. Public perception of this place as a popular birding and tourist destination has changed resentment into support. Moreover, widespread public interest in shorebird migration created the need for visitor facilities, visitor education, and public control mechanisms. These needs led to the hiring of local people, and a new local perception of the point as an employment opportunity. Mary notes, "because of our operation here, we have not only heightened awareness of the local people, you know regarding the importance of this reserve, but there is sort of a good will and interest now developing."

Providing local employment in an economically depressed area is believed by Mary to be a key determinant of local support. And given the historic disruptive uses of the beach, and the abusive treatment of the birds, local support is important to successful on-site protection. In addition to generating local employment, the widespread public interest in shorebird migration evolved into an opportunity to educate many people about other facets of shorebird protection, such as the need for wetland conservation. In discussing the interpretive facilities at Mary's Point, Mary commented, "they add another dimension. We are trying to diversify. We don't just want to talk about the shorebirds. They are the magnet, but once we have captive audience, we might as well tell the people about other

things." Hence, through interpretive facilities, visitors are educated to see more than just the spectacle of birds, and a visit to Mary's Point is made more meaningful.

With understanding and acceptance of the ecological functions of Mary's Point, the local community benefits through local economic growth, a source of local pride, and free natural history education.

In summary, the perception of Mary's Point gradually evolved -- through a co-operative protective process -- from a local recreation area, to an internationally acclaimed and locally accepted shorebird reserve. The process required dedicated local citizens. Changing the perception of Mary's Point also required placing the needs of the shorebirds first, knowledge of the area's ecological significance, education, local involvement, and co-operation at local, national and international levels.

Continued success in shorebird protection is dependent on controlling public visitation by changing the widespread public perception that protected areas are primarily for public enjoyment. David commented:

[p]erhaps protected areas are for people, but not in the way generally perceived, more as educational tools for us to realize they are too valuable to be used as recreational multiple-use areas. Mary's Point is a good example of this kind of approach. The public is not excluded but is controlled, and at the same time educated.

Future success also is dependent on the global challenge of halting widespread destruction of wetlands, again by changing a common perception that wetlands are wastelands, there to be used or abused as humans deem appropriate.

Deductive Content Analysis

Deductive content analysis is a form of thematic content analysis that facilitates systematic and objective comparison of communication messages with a theory or concept (Carney 1972). This application of content analysis is based on pattern-matching logic. As described by Yin (1988:109) such logic "compares an empirically based pattern with a predicted one."

I used deductive content analysis as the final line of inquiry into understanding successful management approaches at this small protected area. Here the "predicted pattern" is a

landscape-level management approach. As stated earlier, ecological and social processes occurring beyond the artificial protected area boundaries are major determinants of ecosystem health. For over three decades now, it has been recognized that protected areas should be integrated into, rather than isolated from, their surrounding ecological and socio-economic region (UNESCO 1988). Variations of a holistic, integrated approach to land management -- such as "regional landscape approach" (Noss 1983); "multiple-use module" (Harris 1984); "ecosystem management" (Agee and Johnson 1988); and "holistic resource management" (Savory 1988), to name a few -- continue to be advocated. In this paper, I use the term "landscape-level management approach."

Small protected areas -- ecological fragments -- are particularly vulnerable to external threats. I therefore expected that small protected areas nominated as examples of excellence, such as Mary's Point, would exhibit a landscape-level management approach. I tested this hypothesis qualitatively using deductive thematic content analysis. To define "landscape-level management approach" in a concrete manner, I developed a conceptual framework (Table 5.5) based on a management effectiveness checklist produced by an international group of experts in protected areas management (MacKinnon et al. 1986). These experts state that effective protected area management should ensure activities are socio-economically acceptable, politically feasible, and ecologically desirable -- key features of landscape-level conservation. I compared the framework with a wide selection of extant literature in protected areas management to verify its validity.

The framework was included as part of the written questionnaire, in which the volunteer stewards in this case study, were asked to indicate which management actions occurred, and whether or not a specific action was adequate to meet the management objectives of Mary's Point. Using this conceptual framework, I systematically compared exploratory findings with the current thinking in protected area management. This comparative analysis is presented in the following table.

Table 5.5 Management approach profile - Mary's Point.

MANAGEMENT OBJECTIVES:		
1. Protect and interpret area		
2. Manage visitation		
3. Develop long-range management plan		
THEORETICAL LANDSCAPE-LEVEL MANAGEMENT APPROACH Adequate ✓ Inadequate IN None ✗		MARY'S POINT MANAGEMENT APPROACH
RESEARCH		
Basic resource inventories	IN	
Socio-economic information	✓	<i>Traditional uses, history of area; local economy; local perceptions of area;</i>
Ecological studies	✓	<i>CWS key reason for extensive research ; annual shorebird surveys since 1974; mudflat biology studies; internationally co- ordinated research</i>
Opportunities for outside researchers	✓	<i>Co-ordinated by CWS</i>
PLANNING		
Regional system plan	IN	<i>Increasing knowledge of key shorebird habitats; this site requires an international, as well as regional system plan because of shorebird ecology</i>
Written management plan	IN	<i>In progress</i>
Specific, measurable objectives	✗	
Research plan that supports management objectives	✗	
Public participation in planning	✗	
IMPLEMENTATION		
Implemented management plan	✗	<i>No management plan</i>

Financial program - - to ensure long --term financial stability	x	<i>Fundraising skills is a reason for excellence, but funds are raised on a year to year basis, solely through volunteer efforts and therefore funding remains a limiting factor</i>
Maintenance program	✓	<i>Locals hired to maintain site and facilities. CWS sometimes provides assistance</i>
Land acquisition program	✓	<i>Private stewardship</i>
Ecological restoration program	x	<i>Not required</i>
Mechanism to communicate with local community	✓	<i>Occurs through hiring locals, informal conversation, and being involved in the community</i>
Volunteer program	✓	<i>Volunteer efforts by adjacent landowners is a reason for excellence. Two full time volunteers maintain and protect site, operate interpretive program; fundraising and train staff.; volunteer continuity a concerns</i>
Mechanism to involve surrounding landowners in management	✓	<i>Adjacent landowners are directly involved, and they work co-operatively with other landowners for regional conservation goals; important to protection</i>
Mechanism to contribute to local community	IN	<i>Local employment, promotion of local businesses, source of local pride; eco-tourism benefits, and natural history education</i>
Mechanism to facilitate co-operation with other agencies and institutions	✓	<i>Reason for excellence, very strong emphasis on co-operative management; at local, national, and global levels</i>
Mechanism to allow public involvement in decision making	x	

Visitor management program	IN	Visitor behavior is adequately controlled, but limitations on visitor numbers and visit duration are needed to ensure continued protection of shorebirds. Controlled publicity and proactive visitor management planning recommended
Conservation education program	4	High quality interpretation is a reason for excellence, important to diversify interpretive message to take pressure off shorebirds and provide a more holistic conservation message.
Mechanism to enforce regulations	4	Federal involvement markedly increased enforcement capacity
MANAGEMENT EVALUATION		
Monitor management actions	4	Informally on an annual basis
Ecological monitoring program	IN	
Socio-economic monitoring program	4	Informally, monitor support level; economic benefits documented
Ongoing training	4	Student summer staff receive rigorous training
Annual report	IN	

The above comparative analysis indicates that the management program at Mary's Point is moving toward a "landscape-level management" approach in terms of the actions done and also in terms of the externally oriented, co-operative style. However, "landscape-level" management does not quite fit the conservation needs of migratory shorebirds. Instead a "global-level" approach is essential. In this situation, partnerships at local, national and international levels are needed to achieve excellence. This management profile demonstrates the importance of co-operation. Strengths in management include research, short-term fundraising, volunteer efforts, local involvement, and conservation education. Based on this conceptual framework, the management program is weak in terms of planning efforts.

In addition to the need for a global focus, other difference between theoretical and Mary Point's management approaches include: (1) having no measurable management objectives; (2) no research plan that supports management objectives; (3) no annual report; (4) no mechanisms to involve public in decision making; (5) no management plan implementation; (6) no financial program; and (7) no ecological restoration program. The latter program, ecological restoration, is not required at this site.

CONCLUSIONS

Bringing together the findings from deductive content analysis, thematic content analysis, and ethnographic interview analysis, we see the outstanding importance of stewardship personality, having a clear sense of purpose, visitor control, co-operation, research, and perception of a place.

The fate of millions of shorebirds has been changed by two community-minded local citizens, knowledgeable about natural history, sensitive to wildlife needs, and empowered enough to take corrective action, despite initial negative public reaction.

Successful shorebird protection at Mary's Point requires a clear sense of purpose. From the beginning, all management actions have been directed toward protecting the shorebirds. At Mary's Point shorebird safety comes first. The reserve is for shorebirds; it is not a tourist destination. This protection message is consistently and clearly communicated to the public through actions, restrictions, and regular communication.

The control of visitor numbers and is critical to shorebird protection at Mary's Point. It requires a two-pronged approach: (1) constant supervision to minimize disturbances to the shorebirds and habitats; and (2) visitor education to increase understanding of the needs of the birds, and of the vulnerable nature of shorebird migration. Controlled publicity is essential to proactive visitor management. The wrong message (promotion as a tourist attraction rather than as a sensitive, protected area) or promotion at the wrong time (during migration), can cause visitors with incorrect expectations, and an exponential increase in visitation.

Working co-operatively is a key aspect of successful stewardship at Mary's Point. Effective shorebird protection is dependent on the health of *all* shorebird habitats, particularly areas where large concentrations of shorebirds stop to rest and refuel (Myers et al. 1987). Accordingly, a co-operative stewardship approach with partners at local, national and international levels is needed to identify critical areas, to protect these sites through an international reserve network, and to minimize shorebird disturbances at each reserve. Co-operation occurred in the early stages in the evolution of Mary's Point, many years before the migration patterns of shorebirds were fully understood. Formation of a partnership between adjacent landowners and a federal conservation organization forged the path toward the co-operative management approach essential to effective shorebird conservation.

National legislation with "local linkages" is a powerful conservation tool. Legal protection does not necessarily change local traditional perceptions or uses of a place. Ongoing supervision, education, and community involvement are required to ensure effective site protection. At Mary's Point, lack of federal funding to staff the shorebird reserve resulted in formation of a key partnership between the federal government and local volunteers. This combination of federal authority with local involvement led to effective protection, and to the development of local pride, attachment, and interest in this small protected area.

Research in shorebird ecology played a pivotal role in changing the perception of Mary's Point. Without ecological knowledge, conservation may be left up to chance. Less than 30 years ago, residents had no comprehension that millions of birds depended on their local beach. Indeed, for 90% of the year, the Point looks like an ordinary beach. Even during the five week migration period, the birds are inconspicuous until they congregate at high tide. A chance discovery, and subsequent research led to the necessary level of awareness and co-operation. How many other critical links in the web of life have been and will be destroyed because we lack detailed ecological knowledge?

Changing society's perception of Mary's Point changed the fate of the shorebirds, and provided real community benefits. The result is successful harmonization of human needs (employment, knowledge of place, and pride) with wildlife needs (protection of a critical link in shorebird survival).

To conclude, shorebird protection is central to the meaning of excellence in conservation management at this small protected area. Like the evolving story of Mary's Point, the meaning of excellence also evolved. In the beginning excellence meant only protection of the shorebirds birds at Mary's Point and protection of the point itself. With a more complete understanding of shorebird ecology and migration patterns, excellence now means effective protection far beyond the boundaries of Mary's Point. It means working with an international network to identify, and to protect the entire chain of shorebird habitats. Maintaining excellence at this holistic level will require ongoing co-operation and education. Moreover, it will require widespread understanding and concern about human impacts on shorebird survival.

Mary's Point is a model of excellence because the primary management objective, shorebird protection at the point, is fulfilled. However, long-term achievement of shorebird protection is not guaranteed. Long-term protection is ultimately dependent on averting large-scale environmental destruction such as oil spills, tidal power projects, and other forms of human encroachment, at *any* of the critical shorebird habitats.

Mary's Point exists as it has for thousands of years. The birds return. The cycle of life continues. Continuation of this cycle largely depends on widespread public concern for wildlife.

LITERATURE CITED

- Agee, J.K. and D.R. Johnson (eds). 1988. *Ecosystem Management for Parks and Wilderness*. University of Washington Press, Seattle, Washington.
- Allen, R.E. 1990. *The Concise Oxford Dictionary of Current English*. 8th ed. Clarendon Press, Oxford.
- Berg, B.L. 1995. *Qualitative Research Methods for the Social Sciences*. 2nd ed. Allyn and Bacon, Toronto, Ontario.
- Bogdan, R.C. and S.K. Biklen. 1992. *Qualitative Research for Education: An Introduction to Theory and Methods*. Allyn and Bacon, Toronto, Ontario.
- Brown, Lesley P. 1994. Attributes of excellence in small protected area management -- preliminary findings. *Natural Areas J.* 14(1):62-63.
- Carney, T.F. 1972. *Content Analysis: A Technique for Systematic Inference from Communications*. University of Manitoba Press, Winnipeg, Manitoba.
- Cole, L. 1983. Urban nature conservation. Pp. 267-268 in A. Warren and F.B. Goldsmith, eds., *Conservation In Perspective*. John Wiley & Sons, Chichester, UK.
- Einsiedel, A. A., Jr. and L.P. Brown. 1992. Is scientific expertise enough to be effective in parks management? Pp. 223-228 in J.H. Willison, S. Bondrup-Nielsen, C. Drysdale, T.B. Herman, N.W. Munro and T.L. Pollock, eds., *Science and the Management of Protected Areas*. Proceedings of an international conference held at Acadia University, Nova Scotia, Canada, May 1991.
- Glaser, B.G. and A.L. Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine de Gruyter, Hawthorne, New York.
- Harris, L.D. 1984. *The Fragmented Forest: Island Biogeography Theory and the Preservation of Biotic Diversity*. The University of Chicago Press, Chicago, Illinois.
- Helmets, D. L. 1992. *Shorebird Management Manual*. Western Hemispheric Shorebird Reserve Network, Manomet, MA.
- Janzen, D. H. 1986. The eternal external threat. Pp. 286-303 in M.E. Soulé, ed., *Habitat fragmentation in the temperate zone*. *Conservation Biology: The Science of Scarcity and Diversity*. Sinauer Associates, Inc., Sunderland, Massachusetts.
- Karr, J.R. 1992. Ecological integrity: protecting earth's life support systems. Pp. 223-238 in R. Costanza, B.G. Norton, and B.D. Haskell, eds., *Ecosystem Health: New Goals for Environmental Management*. Island Press, Covelo, California.

- Kloos, P. 1988. No knowledge without a knowing subject. Pp. 226-236 in R. G. Burgess ed. *Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research*. JAI Press. Greenwich, Connecticut.
- Machlis G.E. and D.L. Tichnell. 1985. *The State of the World's Parks: An International Assessment for Resource Management, Policy and Research*. Colorado, Westview Press, Boulder Colorado.
- MacKinnon, J., K. MacKinnon, G. Child, and J. Thorsell. 1986. *Managing Protected Areas in the Tropics*. IUCN, Gland, Switzerland.
- Morrison, R.I.G. 1987. *The Western Hemispheric Shorebird Reserve Network: An International Conservation Strategy for Shorebirds*. Canadian Wildlife Service.
- Myers, J.P., R.I.G. Morrison, P.Z. Antas, B.A. Harrington, T.E. Lovejoy, M. Sallaberry, S. E. Senner, and A. Tarak. 1987. Conservation strategy for migratory species. *American Scientist* 75:19-26.
- Noss, R.F. 1983. A regional landscape approach to maintain diversity. *BioScience* 33:700-706.
- Noss, R.F. 1987. Protecting natural areas in fragmented landscapes. *Natural Areas J.* 7(1):2-13.
- Odum, E.P. 1986. Introductory review: perspective of ecosystem theory and application. Pp. 1-11 in N Polunin ed., *Ecosystem Theory and Application*, John Wiley and Sons Ltd.
- Reid W.V. and K.R. Miller. 1989. *Keeping Options Alive: The Scientific Basis for Conserving Biodiversity*. World Resources Institute, Washington, DC.
- Riley, M.W. 1963. *Sociological Research: A Case Approach*. Harcourt, Brace and World, Inc. New York, New York.
- Saunders D.A., R.J. Hobbs and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: A review. *Conservation Biology* 5(1):18-34.
- Savory, A. 1991. Holistic resource management: a conceptual framework for ecologically sound economic modeling. *Ecological Economics*, 3:181-191.
- Serafin R., G. Nelson and R. Butler. 1992. Post hoc assessment in resource management and environmental planning: A typology and three case studies. *Environ. Impact Assess. Rev.* 12:271-294.
- Smith, L.M. 1988. Broadening the base of qualitative case study methods in education. Pp. 28-33 in R. G. Burgess ed. *Studies in Qualitative Methodology: Volume 1 Conducting Qualitative Research*. JAI Press. Greenwich, Connecticut.
- Spradley, J.P. 1979. *The Ethnographic Interview*. Holt, Rinehart, and Winston, New York.

- Soulé, M.E., and D. Simberloff. 1986. What do genetics and ecology tell us about the design of nature reserves? *Biological Conservation* 35:19-40.
- Strauss, A.L. 1987. *Qualitative Analysis for Social Sciences*. Cambridge University Press, Cambridge.
- Thurston, H. 1990. Pp. 56-67 *in* *Tidal Life: A Natural History of the Bay of Fundy*. Camden House Publishing, Camden East, Ontario.
- UNESCO. 1988. *Safeguarding our yestermorrows. Biosphere Reserves and the World Heritage Convention*.
- Yin, R. K. 1989. *Case Study Research: Design and Methods*. Sage Publications. Newbury Park, California.

CHAPTER 6

CONCLUSIONS

The goals of this exploratory study were, first, to learn from practitioners how to manage fragile ecosystem fragments -- small protected areas-- successfully, and then, to share the information gained in a format useful to other land stewards. The specific research question was "What are successful management approaches for small protected areas?" I endeavored to address this research question and achieve these goals by:

1. providing a general assessment of the conservation status of small protected areas in Canada and United States,
2. identifying current challenges in small protected area management,
3. identifying characteristics associated with successful small protected area management through case-study analyses of peer-nominated models of excellence,
4. contributing to the developing paradigm of land stewardship as it pertains to conservation of ecosystem fragments.

CONSERVATION STATUS OF SMALL PROTECTED AREAS

The unavailability of a complete data base of Canadian and American protected areas limited the findings to very general trends in the conservation status of small protected areas in Canada and the United States. First, the analyses indicated that although small protected areas do not make significant contributions in terms of total area protected, the majority of conservation lands in Canada and the United States are ecological fragments less than 1,000 hectares in size. Second, it is apparent that small protected areas contribute to a wide variety of conservation objectives. Third, many small protected areas are managed by non-government organizations. Although these findings do not specifically address the research question, the fact that so much effort is going toward protecting ecological fragments confirms the importance of learning about and sharing success stories in small protected area management.

CHALLENGES IN SMALL PROTECTED AREA MANAGEMENT

The challenges experienced by stewards of small protected areas are similar to those reported in studies assessing threats to protected areas (Machlis and Tichnell 1985; Einsiedel and Brown 1992). Based on the survey data and interview transcripts, the direct and indirect threats to long-term ecological viability (maintenance of ecosystem components and healthy functioning of key ecological functions) at the 16 study sites included the following: small size; isolation; high human population growth; oceanic oil spills; tidal power projects; marsh drainage; disrupted fire and flood regimes; loss of hydrological integrity; inadequate legal protection; encroachment by residential developments; introduced species; over-grazing in buffer areas; manipulations of lake level; adjacent development introducing lake contaminants; global climate change; water quality; large influx of visitors; limited funding and staff; low support from upper management.

What was obvious from discussions with the managers was the high vulnerability of the sites: one catastrophic fire could wipe out Ramsey Canyon Preserve; one oil spill near Mary's Point could wipe-out a major portion of a shorebird population; and lack of public support for controlled burns at Point Lobos State Reserve could mean the end of the last Monterey Cypress forest. Many of the places I studied protect "the last" or "the only" known location of a species or ecosystem. Combine the outstanding ecological value of these small protected areas with their high vulnerability, and the stakes are high indeed: there are no second chances. Small protected areas represent an intensified microcosm of the challenges of conservation. In this sense, a study of successful small protected area management is essentially a study of conservation practices at their best; hence, much can be learned from a study of this kind.

CHARACTERISTICS ASSOCIATED WITH SUCCESSFUL SMALL PROTECTED AREA MANAGEMENT

What knowledge has been gained about the effective management of small protected areas from this study of 16 peer-nominated models of excellence? Using descriptive statistical analysis, deductive content analysis, and inductive content analysis of all data sources (interview transcript, management-related documents, and on-site evaluation) I identified 14 characteristics -- "attributes of excellence" -- associated with successful management. Twelve of these attributes are directly related to stewardship approach:

1. strong dedication of stewards (100%);
2. a clear mandate (100%)
3. research, monitoring, and evaluation (100%);
4. partnerships and networks (100%);
5. minimization of visitor impacts (100%);
6. advocacy work (94%);
7. community involvement (88%);
8. a large-scale spatial and temporal management focus (88%);
9. ecological restoration (88%);
10. maximization of visitor experience (88%);
11. innovative management (75%);
12. continuity in management staff (44%);

Two additional "attributes of excellence" associated with site characteristics rather than directly related to management approach are

1. a high level of support for protection of the site (over 80% of the models of excellence had a high support level), and
2. an increase in functional ecological size of the small protected area (100% of the models of excellence had increased in size, since establishment, and 69% are expected to increase again either by boundary expansion, buffer expansion, or both).

I suggest these last two "attributes of excellence" -- high support level and functional size increase -- are indicators of successful small protected area management. Future studies that assess how and why the study sites (or other protected areas) have strong support for management objectives, and also, how and why sites have increased in functional ecological size, would provide valuable insights into effective protected area management.

An understanding of excellence in conservation management of ecological fragments was partially achieved through identification of the 14 "attributes of excellence." I say *partially* because one's understanding can never be complete, particularly with a subject as complex as protected area management. Nor can one's understanding be complete if knowledge is based on one person's perception -- here, the steward's perceptions of why management works at her or his small protected area. In addition, using a cross-sectional research design, assessment of the long-term interplay of the management program with the

ecosystem being cared for, is not possible. Finally the characteristics identified only pertain to some or all of the 16 study sites. By studying a diverse set of small protected areas, theoretical generalizability is increased, however, it would be unwise to assume that this is a complete list of "attributes of excellence," or that the attributes identified in this study are transferable to all small protected areas. Each management program studied has achieved excellence as defined by the site's specific management objectives and within a specific regional context having both limiting and beneficial conditions. Consequently, an important conclusion to be drawn from this research is that no one site should be held up as "the paragon" of excellence in small protected area management.

For the above reasons, I suggest that future studies of effective management of ecological fragments (small protected areas) should include one or more of the following features.

- (1) intense focus on one specific aspect of effective small protected area management. For example, "Why is the co-operative management approach at Mary's Point successful?" or "Why do many people living close to Mary's Point, now appreciate the ecological functions of that point?"
- (2) the involvement of a variety of staff members (paid and volunteer, upper and lower management, past and present) and other people involved directly or indirectly in management of an exemplary small protected area management program to determine why the site is successful from different perspectives. In other words -- using ethnographic terminology -- it is important to understand excellence in conservation management of small protected areas from more than one key informant.
- (3) a study of local community perceptions of the well-managed site. What factors or events lead to a positive perception change of a protected area? Why do communities support or not support a local small protected area?
- (4) a longitudinal research design to measure how key determinants of long-term ecological viability or indicators of effective stewardship change with management approach.

Through the identification of variables related to successful small protected area management -- the attributes of excellence -- this exploratory study provides the foundation for more in-depth studies such as those suggested above.

A CLOSER LOOK AT EXCELLENCE IN CONSERVATION MANAGEMENT

Although the three analytical techniques employed were adequate to meet the third research objective ("identification of characteristics associated with successful small protected area management through case-study analyses of peer-nominated models of excellence"), I was not satisfied with merely a list of characteristics associated with successful small protected area stewardship. I wanted to know which of the above "attributes of excellence" were most important to successful small protected area management, and more importantly, how the attributes functioned together to form an effective management program. To address these questions, and thereby gain a more comprehensive understanding of excellence in conservation management of small protected areas, I found it was necessary to use a more rigorous and holistic analytical technique. Spradley's (1979) ethnographic interview analysis served the purpose well. Using all four analytical methodologies, I completed two in-depth case study analyses of two nominated models of excellence -- Ramsey Canyon Preserve and Mary's Point.

The outstanding characteristics of the Ramsey Canyon Preserve and its management approach include a no-compromise, protection-first mandate; a stringent and very effective visitor management program; financial independence; strong protective legislation (related to private ownership); an advocacy program successful in developing support for the preserve, the Nature Conservancy, and conservation in general; and finally, regional cooperation essential to effective ecological action and advocacy work "beyond the boundaries."

At Mary's Point, key features of the site and stewardship approach include the personalities of the volunteer stewards (wildlife-related knowledge, empathy, and sense of responsibility); a clear sense of purpose; effective visitor control (although increased visitor restrictions are needed); involvement, cooperation, and support for shorebird protection at local, national, and international levels; a strong research program; high quality nature interpretation opportunities; and a positive change in public perception.

A comparative analysis of Ramsey Canyon Preserve and Mary's Point indicated that although the two models of excellence shared common characteristics associated with successful stewardship, as discussed above, the manifestation of these characteristics

varied. In other words, the meaning of "excellence in conservation management" was for these two sites. At Ramsey Canyon Preserve, excellence in conservation management means achieving a successful balance between protection and public use achieved through a protection-first mandate. At Mary's Point excellence initially meant protection only of the shorebirds birds during their stopover at Mary's Point, and protection of the point itself. With a more complete understanding of shorebird ecology and migration patterns, the meaning of excellence evolved to mean effective protection far beyond the boundaries of Mary's Point, to include a global network of shorebird reserves.

Protection is the common theme, or more correctly, *protection-first* seems to be the defining feature of both these outstanding management programs. But *why* protection first? Through ethnographic interview analyses of Ramsey Canyon Preserve and Mary's Point, I came to realize that the latent aspect of successful small protected area management at these two sites was the underlying reason for protection -- *respect for life or the living landscape in its entirety*. This respect for the living landscape was focused on the species and on the life processes that sustain these species.

Importantly, respect for the living landscape -- extended to humans as well. For example, visitors and local residents were treated with respect. Even people who failed to understand the land, and perhaps as a result of this ignorance failed to treat the land with respect, were spoken of kindly and without disdain. Respect for the land and for people was evident in the way both "managers" spoke about the land, the local community, visitors, and so on. I believe it is through genuine consideration for other people that the management approach is successful in reaching people, in helping them to understand why the land is important, and why the needs of the land must come first. Closely related to respect for fellow humans was the personal approach to land stewardship that was evident at Ramsey Canyon Preserve and Mary's Point. This personal approach is congruent with a general philosophy of respect for life; one that is respectful of the vital linkages between people and the land, and that involves taking the time to tell people about these important linkages.

A pre-requisite to placing the needs of living communities first is knowledge of a place. Ongoing research and ecological monitoring were important in trying to understand "processes and pressures" essential to ecological health; to determine the land's ecological carrying capacity in order to establish visitor regulations; to identify specific requirements

of sensitive habitats or species; and to assess the effectiveness of management actions. At both Mary's Point and Ramsey Canyon Preserve, research efforts extended beyond the artificial boundaries to include large-scale ecological processes. At Ramsey Canyon Preserve, the research efforts also included large-scale socio-economic conditions.

What also was apparent from this exploratory study of small protected areas was that the knowledge of a place must be shared with people -- visitors, local residents, and the general public -- in firm yet respectful ways that speak to the purpose of the small protected area, and that clearly indicate what actions are appropriate and what actions are inappropriate given the protection-first mandate. A clear sense of purpose, communicated consistently and with conviction, sends a loud and clear message that the protected area is to be treated with dignity.

At both models of excellence, strict visitor controls were central to implementation of a protection-first philosophy. Placing needs of wildlife before visitors seems to be an essential aspect of successful small protected area stewardship. Placing the needs of wildlife first means allowing visitation only if these needs are not interfered with; strictly enforcing protective regulations; and sending visitors and others a clear consistent message about the purpose of the small protected area (protected for the birds not the public). Another defining feature of visitor management programs at both places, congruent with the protection-first mandate, was the philosophy that *visitation is a privilege not a right*. Proactive visitor management (especially controlled publicity) was also noted to be important to effective protection.

An interesting contradiction related to visitor management was evident from the stewards of Mary's Point and Ramsey Canyon Preserve. At both sites, the managers indicated that it was better to attract visitors with the right attitudes and expectations; people who are visiting the place "for the right reasons." In other words, "nature lovers" are the preferred visitor. Yet both managers also noted that gaining support from the "non-converted" was very important. As Tom Wood commented, "making an impression on the nature lovers is important, but we don't need to convince these people that we need to save Ramsey Canyon." Long-term protection occurs when stewardship efforts convince traditionally non-supportive people that an area and its wildlife need to be protected. So how does one turn on the non-converted, while maintaining strict control over visitation?. This challenge is perhaps one of the essential roles of advocacy work, discussed below.

Development of support was achieved in different ways at the two models of excellence. At Mary's Point, where staff numbers and budget are low and the protected area is located in an economically impoverished region, with a low population, advocacy work primarily took the form of hiring local people, and secondarily of interpretation. Through direct involvement in land stewardship at Mary's Point, people learn what it means to respect living communities, and why it is necessary to treat natural areas with consideration to ensure continuation of both on-site and off-site benefits of conservation, or simply because it is the right thing to do. The stewards of Mary's Point noted that local advocates -- people from the local community -- are one of the strongest ways to develop support because the message is much more credible when it comes from a local community member.

In contrast, at Ramsey Canyon Preserve, with financial independence, but also located in a region requiring economic diversification, advocacy work designed to reach the non-converted, involved community outreach work (educating people about the significant economic and other benefits of protecting the canyon and watershed) more than direct involvement of local people. Community outreach work -- taking the conservation message to the people -- may be particularly important at small protected areas where visitation is not allowed, or where visitor contact is minimal because of limited staff.

At both sites, on-site education and interpretation were fundamental to developing support.

CONTRIBUTIONS TO THE DEVELOPING PARADIGM IN PROTECTED AREAS MANAGEMENT

Numerous variations of a holistic land stewardship approach exist -- "regional landscape approach" (Noss 1983); "multiple-use module" (Harris 1984); "ecosystem management" (Agee and Johnson 1988); and "holistic resource management" (Savory 1991). However, paradigms in protected area management, and land stewardship in general, are in a state of flux, and as Grumbine (1994:27) recently noted, "the evolving concept of ecosystem management is the focus of much current debate." It was for this reason that I used a primarily inductive line of inquiry into the research question, "What are successful management approaches for small protected areas?"

Nonetheless, it was important to compare the exploratory findings of this study with the current thinking in protected areas management. To achieve this objective, I "operationalized" the current protected area management paradigm into a landscape-level management approach conceptual framework, and using this framework applied deductive content analysis to compare systematically and objectively, exploratory findings with extant literature in protected areas management. The framework is based on an International Union for Conservation of Nature and Natural Resources (IUCN), or the World Conservation Union, management effectiveness checklist produced by an international group of experts in protected areas management (MacKinnon et al. 1986; see Appendix C). Applying the framework in case study analysis of the 16 study sites, I found that at 88% of the sites, the management approach could be generally characterized as a landscape-level management. Although the framework has potential as an on-site management audit tool, as suggested by several managers I interviewed, I believe the framework, by itself, provides a very shallow understanding of successful management approaches for small protected areas. In my opinion, what was most beneficial were the two in-depth case study analyses of Mary's Point and Ramsey Canyon Preserve because through rigorous and objective analyses, context-specific management models and processes were identified and presented.

Similarly, 9 of the 14 "attributes of excellence" identified in this study, verify that the nominated models of excellence in conservation management of small protected areas studied, exhibit aspects of landscape-level stewardship approach (as defined and measured by the conceptual framework discussed above). Here I specifically refer to the following attributes "large-scale spatial and temporal management focus", "community involvement", "advocacy work," "research and monitoring", "partnerships and networks", "ecological restoration", "minimize visitor impact", "maximize visitor experience," and "functional size increase."

Grumbine's (1994:29) extensive literature review of the concept "ecosystem management," provides an additional way to compare the exploratory findings of this dissertation with current thinking in protected areas management. From the literature review, Grumbine identified ten dominant themes, "that authors identified explicitly as critical to the definition, implementation, or overall comprehension of ecosystem management." The themes are "hierarchical context", "ecological boundaries", "ecological integrity", "data collection"; "monitoring", "adaptive management", "interagency cooperation", "organization change",

"humans embedded in nature", and "values". With the exception of "adaptive management" and "organization change", all the dominant themes of ecosystem management identified by Grumbine, are encompassed by the "attributes of excellence" revealed in this exploratory study. "Adaptive management" and "organization change" were discussed by some of the managers I interviewed, but these themes were not emphasized across the 16 case studies. Grumbine commented that these two themes, along with "values" were the least referred to in the literature on ecosystem management.

"Stewardship personality" is an attribute of excellence that emerged as important to successful small protected area management at the majority of models of excellence. However this theme is not a component of the theoretical conceptual framework, nor did it emerge as dominant theme associated with ecosystem management in Grumbine's analysis. The models of excellence studied indicate that effective management of small protected areas requires a dedicated group of people - staff, local citizens and organizations -- who recognize that long-term survival of ecosystem fragments requires placing the needs of the total living community, first, above the needs of just one species -- *Homo Sapiens*.

This study re-affirms the current thinking in protected areas management, that is, that effective land conservation requires a holistic, integrated approach. This conclusion is not surprising, because as discussed, the general concept of holistic stewardship is widely discussed and advocated in conservation literature (Grumbine 1994), and is a common way of existence with numerous traditional societies (Goldsmith 1993). Of greater significance, in terms of contributing to the developing paradigm in protected areas management, are the context-specific management strategies used at the 16 models of excellence, that provide insight into *how* to implement landscape-level management. Ethnographic interview analysis shows promise as analytical tool to understand, in a holistic way, a topic as complex as land stewardship.

IN CLOSING

An exploration into the challenge of managing ecological fragments -- small protected areas -- reaffirms the delicate balance of connections that sustain living landscapes. These connections bind people to each other and to the land. These connections are the harmonizing forces between people and people, and between people and non-human nature. When these connections are respected, life is embraced: an indiscernible yet

undeniable sense of integrity is present. It is this sense of rightness, of wholeness, of integrity that we breathe and feel and smell when we come home to nature. For some people tending the garden or listening to the robin break the silence of morning, is their experience of "coming home." Others seem to need expansive wilderness areas to have an engaging nature experience. Regardless of size, each natural place holds the promise of feeling whole again, of feeling the rightness of a place that embodies wholeness, where ever-changing living connections are manifest in dynamic light moods, in fluctuating temperatures, in patterns of color and texture that blend into one, and in endless delightful moments of discovery.

Based on the findings of this study, I believe that "excellence in conservation management of small protected areas" is signified by management's ability to protect and celebrate this landscape integrity in ways that nurture respect for the living world in its entirety.

Conservationists attempt to understand landscape integrity in the form of a measurable construct: "ecological viability"; "naturalness"; "ecosystem health." Land stewards attempt to maintain or restore this inherent integrity, with strategies known as "integrated resource management," "holistic stewardship," or "ecosystem management," depending on the latest paradigm. But ultimately neither science nor new land management paradigms will heal broken connections, or prevent ongoing massive landscape fragmentation. Rather we need to know in our day-to-day lives that it is healthy, diverse natural landscapes --- not money, or "progress" -- that ultimately sustains us. Our thoughts, language, and actions must reflect this fundamental truth if we ever hope to regain healthy landscapes -- the foundation of healthy and meaningful lives.

LITERATURE CITED

- Agee, J.K. and D.R. Johnson (eds). 1988. *Ecosystem Management for Parks and Wilderness*. University of Washington Press, Seattle, Washington.
- Einsiedel, A. A., Jr. and L.P. Brown. 1992. Is scientific expertise enough to be effective in parks management? Pp. 223-228 in J.H. Willison, S. Bondrup-Nielsen, C. Drysdale, T.B. Herman, N.W. Munro and T.L. Pollock, eds., *Science and the Management of Protected Areas*. Proceedings of an international conference held at Acadia University, Nova Scotia, Canada, May 1991.
- Goldsmith, E. 1993. *The Way: An Ecological Worldview*. Shamhala, Boston, Massachusetts.
- Grumbine, R.E. 1994. What is ecosystem management? *Conservation Biology* 8(1):22-38.
- Harris, L.D. 1984. *The Fragmented Forest: Island Biogeography Theory and the Preservation of Biotic Diversity*. The University of Chicago Press, Chicago, Illinois.
- Machlis G.E. and D.L. Tichnell. 1985. *The State of the World's Parks: An International Assessment for Resource Management, Policy, and Research*. Westview Press, Boulder Colorado.
- MacKinnon, J., K. MacKinnon, G. Child, and J. Thorsell. 1986. *Managing Protected Areas in the Tropics*. IUCN, Gland, Switzerland.
- Noss, R.F. 1983. A regional landscape approach to maintain diversity. *BioScience* 33:700-706.
- Savory, A. 1991. Holistic resource management: a conceptual framework for ecologically sound economic modeling. *Ecological Economics*, 3:181-191.
- Spradley, J.P. 1979. *The Ethnographic Interview*. Holt, Rinehart, and Winston, New York.

APPENDICES

APPENDIX A Jury Nomination Package

Recommended Sites of Excellence in Conservation Management

Please check one of the following for each site:

Yes – if you are familiar with the site and **agree** it demonstrates excellence in conservation management.

No – if you are familiar with the site but in your opinion it does **not** demonstrate excellence.

DK – if you are **not familiar** with the site.

Name of Site	Location	Yes	No	DK
Alice Lake Provincial Park	Howe Sound Corridor, British Columbia			
Cleland Island Ecological Reserve	Campbell River, B.C.			
Minnekhada Regional Park	Greater Vancouver Reg. District, B.C.			
Porteau Cove Provincial Park	Howe Sound Corridor, B.C.			
Robson-Bight Ecological Reserve	Vancouver Island, British Columbia			
Roderick Haig-Brown Provincial Park	Adams River near Kamloops, B.C.			
Riefle Island Bird Sanctuary	Fraser Delta, B.C.			
Rolley Lake Provincial Park	Vancouver, B.C.			
Ann and Sandy Cross Conservation Area	near Calgary, Alberta			
Antelope Creek Habitat Development Area	Brooks, Alberta			
Clifford E Lee Bird Sanctuary	County of Parkland, Alberta			
Coyote Lake Nature Sanctuary -Hopkins	County of Leduc, Alberta			
Kennedy Coulee Ecological Reserve	Alberta/Montana border			
Plateau Mountain Natural Area	AB			
Red Rock Coulee	near Medicine Hat, Alberta			
Wagner Bog Natural Area	Edmonton, AB			
Living Prairie Museum	Winnipeg, Manitoba			
Delta Marsh, U of M Field Station	MB			
Fort Whyte Center for Environmental Educa.	Winnipeg, MB			
Alfred Bog	Prescott County, Ontario			
Backus Woods Conservation Area	Long point, Lake Erie, Ontario			
Crawford Lake Conservation Area	Halton Region, Ontario			
Dorcas Bay Nature Reserve	South of Tobermory, Ontario			

Name of Site	Location	Yes	No	DK
Hope Bay Provincial Nature Reserve	Bruce Peninsula, Ontario			
Kalopore Uplands Resource Mgt. Area	Ontario			
Lions Head Provincial Nature Reserve	Ontario			
Longpoint Marsh National Wildlife Area	Long point Spit, Lake Erie			
Mono Cliffs Natural Environment	Berry, Ontario			
O'Donnel Point Nature Reserve	Parry Sound District, Ontario			
Ojibway Prairie Nature Reserve	Windsor, Ontario			
Ouiment Canyon Nature Reserve	Thunder Bay			
Pink Lake	Ontario			
Potholes Provincial Nature Reserve	Wawa, Ontario			
Prince Edward Point National Wildfire Area	Prince Edward County, Ontario			
Purdon Bay Conservation Area	Lanark, Ontario			
Royal Botanical Gardens	Hamilton, Ontario			
Spooky Hollow Sancturay	Long Point, Ontario			
Wye Marsh Wildlife Centre	Ontario			
Centre d'interprétation du lac Beauin	Québec			
Ile aux-Lièvres (Hare Island)	Estuaire du St-Laurent, Quebec			
Parc de Miguasha	Miguasha, Québec			
Rinter Valley Land Trust	Dunkin, Quebec			
Daly Point Marsh	New Brunswick			
Dominion Park	New Brunswick			
Mary's Point - Western Hemisphere Shorebird Reserve	Harvie, New Brunswick			
Sackview Waterfowl Park	Sackview, New Brunswick			
Tula Farmland Trust	Fredericton, New Brunswick			
Shay Lake Area	New Brunswick			
Royalty Oaks Natural Area	Charlottetown, P.E.I.			
Townshend Woodlot	Charlottetown, P.E.I.			
DeRoche Point.	Tracadie Bay, P.E.I.			

Name of Site	Location	Yes	No	DK
Independence Mine State Historic Park	Alaska			
Sitka National Historic Park	Sitka, Alaska			
	Pacific Northwest			
Padilla Bay Natural Area	Bayview, Washington			
Protection Island National Wildlife Reserve	Jefferson County, Washington			
Yellow Island Preserve-Nature Conservancy	San Juan Islands, Washington			
Cascade Head Natural Area	Lincoln City, Oregon			
Lawrence Grasslands	North Central Oregon			
	Pacific Southwest			
Anderson Marsh State Historic Park	California			
Ano Nuevo State Park	California			
Audubon Canyon Ranch	California			
Cabrillo National Monument	San Diego, California			
Elkhorn Slough NERR	Moss Landing			
Fitzgerald Marine Reserve	San Mateo County, California			
Grizzly Creek Redwoods State Park	Humboldt County, California			
Jepson Prairie	Suisun, California			
Mount Burdell Open Space Preserve	California			
Muir Woods National Monument	Mill Valley, California			
Paul L. Watis Sanctuary, National Audubon	Sacramento, CA			
Point Lobos State Reserve	Carmel, California			
Ring Mountain	Marin County, California			
San Joaquin River National Wildlife Reserve	California			
Tijuana Estuary	San Diego, California			

Name of Site	Location	Yes	No	DK
	Rocky Mountain			
Alkali lake Sanctuary, National Audubon	Spirit Wood, North Dakota			
Icelandic State Park Gunlogson Nature Preserve	Cavalier, North Dakota			
Lake Metigoshe State Park	Bottineau, North Dakota			
Fort Laramie	Torington, Wyoming			
Jewel Cave	South Dakota			
Newton Hills State Park	South Dakota			
Wellfleet Bay Wildlife Sanctuary	Montana			
Coral pink Sand Dunes State Park	Kanab, Utah			
	Mid West			
Helen Allison Savannah	Anoka County, Minnesota			
Prairie Coteau State Natural Area	Minnesota			
Lillian Annette Rowe Sanctuary	Gibbon, Nebraska			
Cayler Prairie State Preserve	Dickinson County, Iowa			
Hayden Prairie	Iowa			
Aullwood Audubon Center and Farm	Ohio			
Conkles Hollow-Christmas Rocks Nature Preserve	Lancaster, Ohio			
Lake Isaac	Middleburg Heights, Ohio			
Hoosier Prairie State Nature Preserve	Griffith, Indiana			
Crosby Arboretum	Picayne, Missouri			
Prairie State Park	Missouri			
Cave Creek Glade Nature Preserve	Southern Illinois			
Mark Twin National Wildlife Refuge	Pike County, Illinois			
Volo Bog State Natural Area	Ingleside, Illinois			
Kalamazoo Nature Center	Kalamazoo, Michigan			
	Mid-Atlantic			
Bear Run Nature Reserve	Fayette County, Pennsylvania			
Edgar Allan Poe NHS	Phil., Pennsylvania			
Fort Necessity National Battlefield	Pennsylvania			
Hawk Mountain Sanctuary	Pennsylvania			
Jennings Environment Education Center	Slippery Rock, Pennsylvania			

Name of Site	Location	Yes	No	DK
Nolde Forest State Park	Reading, Pennsylvania			
White Clay Creek	Landenberg, Pennsylvania			
BearTown State Park	Hillsboro, West Virginia			
Eastern Neck National Wildlife Reserve	Rock Hall, Maryland			
	North Atlantic			
Rock Creek Park	Washington, D.C.			
Dodge Point	New Castle, Maine			
Greenland Point Environmental Center	Princeton, Maine			
Matinicus Rock Audubon Sanctuary	Midcoast Maine			
Berlin Ichthyosan State Park	Austin, New York			
Caleb Smith State Park Preserve	Smithtown, New York			
Constitution Marsh Sanctuary, National Audubon Society	Garrison, New York			
Genesee County Park	Bethany, New York			
ChesterField Gorge	Route a ChesterField, NH			
Maudsley State Park	Newburypont, Massachusetts			
	South West			
Logoly State Park	McNeil, Arkansas			
Pine City Natural Area	Arkansas			
Guadalupe Mountains National Park	Salt Flat, Texas			
Parkhill Prairie	Collin County, Texas			
Sable Palm Grove Sanctuary, National Audubon Society	Brownsville, Texas			
Caroline Dormon Nature Preserve	Saline, Louisiana			
	South East			
Oak Ridge Barveus	Oak Ridge, Tennessee			
Piedmont National Wildlife Refuge	Georgia			
Bluff Mountain Natural Area	Ashe County, North Carolina			
Nags Head Woods	Nags Head, North Carolina			
North Carolina Coastal Islands Sancturay, National Audubon Society	Wrightsville Beach			
Clam Pass Park	Naples, Florida			
Crystal River National Wildlife Refuge	Crystal River, Florida			
Hobe Sound National Wildlife Refuge	Hobe Sound, Florida			

Name of Site	Location	Yes	No	DK
Key Largo hammock State Botanical Site	Florida			
Lee County Nature Center	Florida			
Tampa Bay Sanctuary	Tampa, Florida			
	Western			
Hassayampa River Preserve	Wickenburg, Arizona			
Ramsey Canyon	Sierra Vista, Arizona			
Patagonia Sonoita Bird Sanctuary	Arizona			
Hanu O Na Pali Natural Area Reserve	Na Pali Coast, Hawaii			
Kilanea Point National Wildlife Refuge	Kauai			
Mount Kaala Natural Area Reserve	Oahu, Hawaii			

Nomination Form

Models of Excellence in Conservation Management of Small Protected Areas

You are invited to nominate a small protected area which demonstrates excellence in conservation management/stewardship. Through peer consensus, the most outstanding models will be identified and will form the basis of an international study on effective management approaches for small protected areas.

Would you like a copy of the results?

Yes Send to: _____

Selection Criteria:

1. Site must be a **"protected area"** defined as land officially reserved for the protection of natural intrinsic values rather than for recreational or resource extraction purposes.
2. Site must be **"small"** defined here as **less than 1000 hectares**, which is the minimum-size criteria set by the International Union for the Conservation of Nature (IUCN). **1000 ha is equivalent to 10 sq. km, 2,471 acres, or 3.86 sq. mi.**
3. The site must be a **model of excellence in conservation management** where **"management"** is defined as action toward desired end results and may include protection, research, education or whatever activities are deemed necessary to meet the site's specific management objectives. The site can be managed by an individual (private landowner), private organization or government agency and can be located anywhere in North America.

Name of Site _____

Manager/Management Agency _____

Phone Number _____

Why did you choose this site?

(Use reverse side if you are nominating more than one site)

Thank you !

Jury Member Nomination Form

If you know of any individuals or organizations which you feel should be included on an international professional jury asked to nominate models of excellence in conservation management, please list their names below. Thank you,

1. Name _____

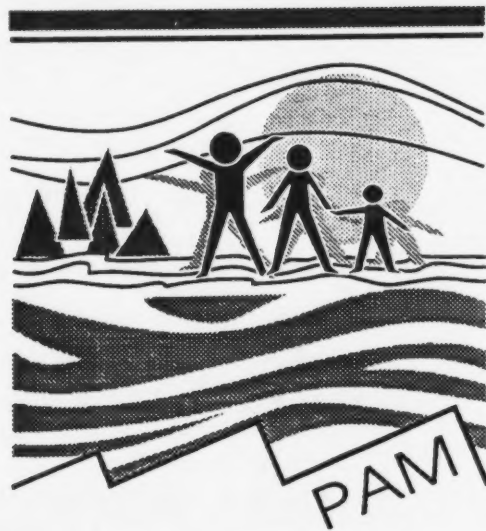
Phone Number _____

2. Name _____

Phone Number _____

A Survey on
**Conservation
Management
of
Small Protected
Areas**

University of Alberta
Edmonton, Alberta, Canada



Conservation Management of Small Protected Areas

Thank you for participating in this study on management approaches for small protected areas (2500 A/1000 ha). Your opinions will make an important contribution toward understanding how to effectively manage small protected areas. All information is strictly confidential and no specific examples of management strategies will be used without prior written consent.

PART I

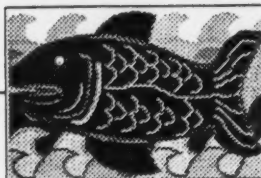
In this first section, you are asked to share your insights as manager of a site demonstrating excellence in conservation management.

1. Do you consider this protected area to be a site which demonstrates excellence in conservation management? Why/Why not?

2. In what area(s) of management does this site excel?

3. What are the reasons for success in the areas mentioned above?

4. If you were starting over as manager of this site, name one thing you would do differently?



5. What are the most important things you have learned that would be valuable for other managers of small protected areas to know?

6. What are the three most useful publication/resource materials you have found as a manager of a small protected area?

1.

2.

3.

7. What protected area would you recommend as a small protected area (less than 1000 ha/2500 acres) which demonstrates excellence in conservation management?

Name of Site

Manager/Management Agency

Location

Phone Number

Why did you choose this site?

PART II

A primary goal of this research study is to document the management approach utilized at this site. The next set of questions pertains to various aspects of your management program.

8. Who is responsible for management of this site?



9. What 3 areas of management are priority for this site?

1st. priority _____

2nd. priority _____

3rd. priority _____

10. What is the greatest challenge in meeting the mandate of this site?

11. Which of the following groups are actively involved in managing this site?

(Circle all appropriate numbers).

	Yes	No
Local Land Owners.....	1	0
Non-government Organization	1	0
(Specify) _____		
Government Officials	1	0
Other resource management agencies	1	0
(Specify) _____		
School/University	1	0
Others (specify) _____	1	0



12. Please indicate:

- A. total number of staff
- B. combined total weekly hours worked
- C. months worked per year.

	A Total number staff	B Total weekly hours	C Months worked
Year Round Staff			
Seasonal Staff			
Interns			
Volunteers/Docents			
Others (specify) _____			

13. Do you and your staff receive training?

Yes 1

No 0

➔ If yes, please indicate number of days training/year.

Year Round Staff _____

Seasonal Staff _____

Interns _____

Volunteers _____

14. What is the **annual operational budget** for this site? (*Operational budget* is defined here as including salaries and operational costs but excluding capital expenditures.)

\$ _____ /year.



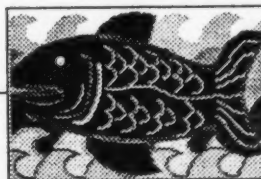
15. What approximate percentage of the annual operational budget is spent on the following items:

Budget Item	Percentage
• Staff/volunteer training	
• Salaries	
• Physical maintenance of facilities	
• Resource inventory	
• Research/monitoring	
• Active management (e.g. exotic species control) ..	
• Restoration ecology	
• Environmental education/interpretation	
• Public relations/community out-reach work	
• Promotions/marketing	
• Other (specify)	

16. What percentage of the annual operational budget is obtained from the following sources of funds:

Funding Source	Percentage
Government	
Special grants	
Local fundraising	
Donations	
Entrance fee	
Other (specify)	

If fund raising is a source of revenue, what types of events have been most successful?



17. Does this protected area have:

If you circled yes, please indicate whether the program is Adequate or Inadequate to meet your current management objectives by checking "A" or "I".

	Yes	A	I	No
Regional system plan*	1	—	—	0
Written management plan*	1	—	—	0
Implemented management plan.....	1	—	—	0
Monitored management plan	1	—	—	0
Specific, measurable management objectives	1	—	—	0
Basic resource inventories*	1	—	—	0
Socio-economic information base*	1	—	—	0
(e.g. information on needs and aspirations of local community; visitor surveys)				
Opportunistic research projects.....	1	—	—	0
Research plan that supports management objectives*	1	—	—	0
Ecological restoration program	1	—	—	0
Monitoring program to assess ecological changes.....	1	—	—	0
Environmental education/interpretation program*	1	—	—	0
Volunteer program*	1	—	—	0
Visitor management program.....	1	—	—	0
Mechanism to allow public involvement in decision making	1	—	—	0
Mechanism to contribute to local economy	1	—	—	0
(e.g. tourism, employment opportunities, etc.)				
Mechanism to communicate with local community.....	1	—	—	0
Mechanism to involve surrounding landowners in mgt.	1	—	—	0
Mechanism to facilitate co-operation with other agencies and institutions	1	—	—	0
Land aquisition program	1	—	—	0
Financial program to ensure long-term financial stability ..	1	—	—	0
Annual Report*	1	—	—	0



18. Please indicate whether or not the following studies have been started for this site:

	Yes	No
Resource inventory studies (specify) _____	1	0
Studies of species population dynamics	1	0
Studies of population status of key species (name species _____)	1	0
Information on relationships between species and their habitat	1	0
Studies on predator-prey relationships	1	0
Information on the carrying capacity of the habitat for key species	1	0
Studies on ecological succession	1	0
Information on disturbances	1	0
(specify) _____		
Monitoring threats to ecological viability	1	0
(specify) _____		
Visitor impact studies.....	1	0
(specify) _____		
Visitor surveys.....	1	0
Other (specify) _____	1	0

19. Please indicate whether or not the following visitor services are available for this site?

	Yes	No
*Site-specific brochures	1	0
Formalized trails/boardwalks	1	0
Regulatory signs.....	1	0
Interpretive signs	1	0
Public programs (number/wk ____)	1	0



	Yes	No
School programs (number/wk _____).....	1	0
Interpretive exhibits	1	0
Visitor information center	1	0
Public washrooms.....	1	0
Handicap accessible trails/facilities.....	1	0
Overnight facilities	1	0
Teacher resource guide/study kits	1	0
Book/publication sales	1	0
Identification arm patch___, pin___ or sticker___	1	0
*Species checklists.....	1	0
*Newsletter	1	0
Site-related books.....	1	0
Other_____	1	0

20. What mechanisms have been most effective in increasing public awareness of this site?

21. What mechanisms have been most effective in achieving positive community involvement?

22. What actions have been taken to develop support for this protected area?



University/college.....	1	0
Schools.....	1	0
Industry.....	1	0
Government.....	1	0
Other resource management agencies.....	1	0
Landowners.....	1	0
Clubs (Scouts).....	1	0
Non-government organizations (specify).....	1	0
Other (specify).....	1	0

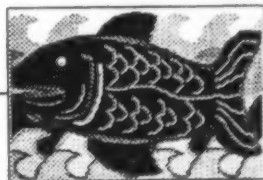
24. Which of these partnerships have been most successful?

25. What economic benefits does this site provide to the local community?

26. On a scale of zero to five, where 0 is no active management and 5 is intensive active management, how would you rate the management of this site? (Circle most appropriate number).

0 1 2 3 4 5

No active management Moderate management Intensively managed to maintain key species/ processes.



What type of active management is implemented?

PART III

The purpose of the next questions is to evaluate the approximate conservation value of this protected area.

27. What is the **most serious threat(s)** to the site's long-term **ecological viability**? *Ecological viability is defined here as maintenance of ecosystem components and healthy functioning of key ecological functions.*

28. Are these threats documented or perceived?

Documented 1

Perceived 0

29. Are any actions being taken to reduce the threat(s) mentioned above?

Yes 1

No 0

→ If yes, please describe actions?



30. For the following set of questions, please circle the most appropriate answer: Yes (1), No (0), NA (not applicable).

	Yes	No	NA
Connectedness			
Is the site physically joined to another area in its natural state?	1	0	NA
Is the area part of a travel corridor for migrating species?	1	0	NA
Is the site in a critical situation for interconnecting natural areas?	1	0	NA
Is the site used by species with large area requirements?	1	0	NA
Nature-oriented Human Use			
Is public access permitted?	1	0	NA
Are the site's features so exceptional that it attracts national___ or international visitors___?	1	0	NA
Is the area used for scientific research?	1	0	NA
Do educational institutes use the site?	1	0	NA
Is the site used for passive, nature-related recreation?	1	0	NA
Rarity			
Does it contain a habitat with limited representation in your state/province/territory? specify _____	1	0	NA
Does it contain a habitat with limited representation in the country? specify _____	1	0	NA
Does the site contain a significant/rare/endangered plant or animal species? specify _____	1	0	NA
Does the site protect significant cultural features?	1	0	NA
Does the site protect significant geological features?	1	0	NA
Completeness			
Does it contain an unusual diversity of plant and/or animal communities?	1	0	NA



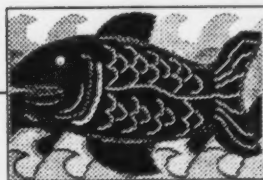
	Yes	No	NA
Do the ecological communities have a full complement of species?	1	0	NA
Does the site protect a watershed?	1	0	NA
Is the basic integrity of the system still intact to offer realistic potential for reintroductions?	1	0	NA
Are large predators present?	1	0	NA
Vulnerability			
Is preservation of the site guaranteed by deed restriction, easement or established regulatory authority?	1	0	NA
Is the site adequately protected from resource extraction?	1	0	NA
Is the site well buffered from serious external impacts?	1	0	NA
Will this site be ecologically viable in 10 years?	1	0	NA
Manageability			
Is the site big enough to meet management objectives?	1	0	NA
Is the maintenance of species compatible with present neighbouring land uses?	1	0	NA
Is the maintenance of species compatible with future neighbouring land uses?	1	0	NA
Is the site big enough for the maintenance or reestablishment of normal ecological processes?	1	0	NA



31. How would you rate each of the following group's **level of support** for protection of the site?

Please circle the most appropriate number.

	No Support	Very Low	Low	Moderate	High	Very High	Not Applicable
Local government (County/Municipal)	1	2	3	4	5	6	0
Provincial/Territorial/ State government	1	2	3	4	5	6	0
Federal government	1	2	3	4	5	6	0
Agriculture community	1	2	3	4	5	6	0
Local community	1	2	3	4	5	6	0
Industrial community	1	2	3	4	5	6	0
Surrounding landowners	1	2	3	4	5	6	0
Cultural groups	1	2	3	4	5	6	0
Local educational institutes	1	2	3	4	5	6	0
Non-government organizations	1	2	3	4	5	6	0
Scientists	1	2	3	4	5	6	0
Chamber of Commerce	1	2	3	4	5	6	0
Other (specify) _____	1	2	3	4	5	6	0



PART IV

Your answers to the following section will provide general information on

32. Where is this protected area located?

Urban 0

Suburban 1

Rural 2

→ If rural, approximately how far away is the nearest city? _____ (miles/km)

33. What is the size of this protected area?
(Please give the size in acres if possible)

34. In 10 years, do you expect the size of this protected area to:

Decrease 0 → By how much? _____

Remain the same 1

Increase 2 → By how much? _____

35. When was this site established as a protected area?

_____ (year established)

36. Why was this land established as a protected area?



37. Does the site have a logo?

Yes 1

No 0

→ If yes, what is the story behind the logo?

38. Who were the **key people or organizations** responsible for establishing this place as a protected area?

39. Which of the following groups were **consulted** regarding establishment of this protected area?
(Please circle **all** appropriate numbers).

	Yes	No
Local citizens	1	0
Local government	1	0
Neighbours of the site	1	0
Local native people.....	1	0
Conservation organizations	1	0
Other (please specify)	1	0

40. What type of legislation protects this site?



41. What type of ecosystem(s) are represented by this protected area?

42. Who is the **owner(s)** of this protected area?

43. Are there ways in which this protected area directly benefits from another protected area in this region?

Yes 1

No 0

44. Do other sites benefit from this protected area?

Yes 1

No 0

45. Approximately how many people visit this site annually?

46. Over the past five years, has the visitation rate...

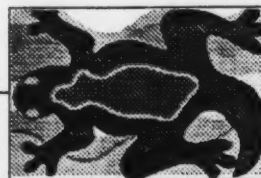
Decreased 0

By what percent? _____

Remained the same....1

Increased 2

By what percent? _____



 PART V

The last questions relate to yourself and your experience as a protected area manager. These questions will be used for classification purposes only. Like the rest of the questionnaire, your answers will be kept completely confidential.

47. Are you currently **responsible for the management of one protected area or several protected areas.**

(Please circle appropriate number.)

One protected area..... 1

More than one protected area 2

48. How many **years** in total have you been the **manager** of this site? _____

49. Is your position as a protected area manager **paid or voluntary?**

Paid 1

Voluntary 2

50. Is your position **full-time or part-time?**

Full-time 1

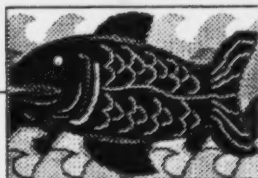
Part-time..... 2

51. How many **total years of work experience** do you have in **protected areas management** or other fields directly related to it?

_____ (years)

52. What is the highest level of education you have completed? _____

53. Please state your area(s) of specialization.



54. Do you have any specialized training in protected areas management or related fields?

Yes 1

No 0

➔ If yes, please describe your specialized training.

Would you like a copy of the survey results?

Yes ☐ ➔ Mailing address _____

No ☐

Please return by _____ to:

Lesley Brown
Protected Areas Management Program
Faculty of Extension
University Extension Centre
112 Street and 83 Avenue
University of Alberta
Edmonton, Canada T6G 2T4

THANK YOU AGAIN

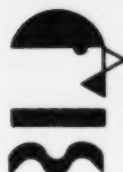
This survey was made possible by financial support from The Recreation, Parks and Wildlife Foundation, Wildlife Habitat Canada, and the Protected Areas Management Program, University of Alberta.



Appendix C. Taxonomic and componential analysis of domain -- "stages in the evolution of protecting Mary's Point."

DIMENSIONS OF CONTRAST				
CONTRAST SIT Stages	Date	Persons Involved	Cause of Stage Development	Consequences of Stage
Local recreation area	1920s to 1960s	Weekend beach use by local residents. 50 people week, using private drive	No recognition of area's significance by absentee owner, locals, naturalists or wildlife authorities.	Very high disturbance to birds and beach (vehicles on beach, parties, shooting and chasing birds).
Recognition of area's importance and need for protection	High tide during shorebird migration, August 1963	Local resident Mary Majka	Chance discovery - right person in the right place and time	Immediately initiate protective actions: try to secure land, try to stop disturbances to birds.
Informal shorebird observations at Mary's Point initiated	1963 to present	Volunteers: David Christie and Mary	As trained biologists, David and Mary recognized the need to gather information	Greater understanding of importance of Mary's Point
Formal shorebird surveys	1974	Dr. Guy Morrison (Canadian Wildlife Service)	CWS taking a greater interest in non-game species; initiate Maritimes Shorebird Survey	Nationally coordinated shorebird research to understand ecology and migration patterns
Partnership between federal government and local volunteers	1974 to present	Volunteers: Mary and David in close cooperation with CWS	CWS asks for volunteers to conduct surveys. Mary and David volunteer	Dr. Morrison recognizes area's significance for shorebirds, especially for semipalmated sandpipers.
de facto Reserve: protection by adjacent property owner and Reserve Buffer	1975 to present	Aljaks Volunteers: Mary and David	D. Christie and Aljaks acquire adjacent property which includes traditional beach access	Controlled beach access; volunteer guardians insist people do not bother the birds or disturb vegetation, disruption gradually diminishing
Legal designation and acquisition: Mary's Point protected as part of the Sheslay National Wildlife Area	1978	Canadian Wildlife Service Later, Wildlife Habitat Canada donates money	Knowledge of area's ecological significance for shorebirds, increasing interest in non-game species	Increase protection; increased enforcement area posted with CWS signs
Local provincial federal partnership formed to protect shorebirds	Ongoing since 1975	Volunteers: Mary and David; NFI Federation of Naturalists and Canadian Wildlife Service	No federal money for on-site operations (supervision and education)	Mary and David continue as volunteer guardians; year round protection of area; constant beach supervision during migration; minimal disturbance to area and birds
Public access to beach established	1979	Local laborers hired to do work volunteers: Mary and David do planning, fundraising and supervise laborer also control and educate visitors	Increasing number of reserve visitors stopping by Aljaks's private residence	Build a small parking lot and walking access to beach; local employment. Mary and David always at beach during high tide; informal visitor control and education
Ramsar site designation	1982	Ramsar Convention Canadian Wildlife Service Volunteers: Mary and David; Canadian Wildlife Service	Knowledge of area internationally significant wetland for shorebirds Year round supervision and education controlled access; federal legislation and enforcement; local employment opportunities	International recognition and cooperation No vandalism or other acts of resentment Disruptive traditional uses stopped Local defenders of the reserve's importance
Local acceptance: locals proud of Mary's Point; appreciate economic spin-offs; increasing support for area	Since 1986			Support network; international linkages; international recognition which increases support for local conservation efforts; local resident hired to cater designation ceremony
Western Hemisphere Shorebird Reserve Network designation	1987	WHSRN This network is a collaborative conservation initiative involving numerous organizations	Knowledge of area critical migration staging area for over 250 (44) shorebirds or 30% of the flyway population of a single species	
Media attention increasing	1987	Local newscasters and radio stations. Cbc; foreign film companies	International designations	Visitation doubles after every media story; need to control publicity

Shorebird protection beyond Mary's Point	1988	WISRN, Surinam government (Canadian Wildlife Service)	critical shorebird wintering grounds established as Sister Western Hemisphere Shorebird Reserve, other areas in Upper Bay of Lundy protected	Increased protection of shorebirds
Hire interpretive wardens	1989 to present	Local students, hired, trained and supervised by volunteers. Mary and David, funds raised by Mary and David, funds handled by NBF Federation of Naturalists	Visitor problems occurred when volunteer guardians could not supervise beach	Increased visitor supervision and education, always somebody at beach, visitor problems decrease, educational work opportunity for local youth, youth defend reserve
Interpretive centre	Opened 1992	Canadian Wildlife Service, local laborers hired to do work, volunteers. Planned and operated by volunteers (Mary and David)	Increasing visitation, visitor typology changing from ornithologists to curious spectators, need to educate people	Increased visitor understanding of reason for the reserve, the needs of the birds and the phenomena of shorebird migration
Visitor education facilities expand (marsh and upland forest interpretive trails, expand interpretive centre)	1992 to present	Volunteers: Mary and David, local laborers, Shepsody Fish and Game Association, NBF Federation of Naturalists	Need to divert visitor pressure away from birds, important to diversify interpretive message	Reduced disturbance, increased understanding area's natural history, local economic benefits, bookstore generates income for NBF Federation of Naturalists
Management operations plateau	1993	Local volunteers, CWS and local students	No need for more interpretive facilities, continue research, interpretation, protection with help of hired local youth	No new projects, continue research, supervision and interpretation, continue hiring local youth
Model Western Hemisphere Shorebird Reserve	mid 1990s	WISRN managers, biologists and regional conservation organizations	Interest Mary's Point due to cooperative management approach and volunteer interpretation	Visitors to Mary's Point to learn about management approach, consulted for advice
Master plan development	1998 in progress	Plan developed by Mary and David in cooperation with Canadian Wildlife Service	Minimal disturbance to birds but reaching site's visitor carrying capacity (15,000 visitors during migration), need to provide continuity in management	Not known yet



New Brunswick Federation of Naturalists
Fédération des naturalistes du Nouveau-Brunswick

277 Douglas Avenue, Saint John, NB Canada E2K 1E5

Hemispheric Shorebird Reserve, Mary's Point

RR 2, Mary's Point Road,
Albert, N.B. E0A 1A0
Sat, 17 Jun, 1995

Lesley Curthoys Brown,
P.O. Box 291,
Rochester, Alberta T0G 1Z0

Dear Lesley:

First of all we would like to thank you for selecting Mary's Point as one of two in-depth studies for your thesis on small natural areas. We are honoured to have been chosen.

We appreciate your sensitive and understanding perception of our work, of how we have proceeded on a philosophical as well as a practical level. Your thesis helps give us a new perspective on this place and the way we are trying to manage it.

When David and I started to protect and study Mary's Point we were guided by concern, sentiment, and scientific curiosity instead of organized planning. We were lucky in many respects and, according to your and others' evaluations, quite successful. However, with the growing number of visitors we now realize that by establishing access, facilities and interpretation we have also invited potential problems. Now we have to carefully balance the welfare of the birds with those other aspects.

Planning for the future recently became urgent and I began drafting a master plan for Mary's Point. Your unbiased and accurate assessment, in which you applied analytic methods, will help us revise the unfinished plan and make it a much better document.

Having had the opportunity to study many centres on this continent you are able to view our work in a broad context and focus on the most important aspects of protection a small natural area and conservation of its wildlife. Your work should be of great interest and help to managers of natural areas, large and small. (Having mentioned your study, we are already getting inquiries about it.) As far as we know, nothing so well prepared and researched is available to date.

Congratulations.

Sincerely,

Mary Majka
Mary Majka

David Christie
David Christie

e-mail address: maryspt@nbnet.nb.ca